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THE SCHICK TEST IN YOUNG ADULTS.

By N. E. GOLDSWORTHY[1] AND HAROLD WILSON,[1]

From the Department of Bacteriology, University of Sydney, and the Kolling Laboratory, Royal North Shore Hospital of Sydney.

IT is generally accepted that relatively few adults react to the Schick test. We were therefore surprised and not a little disturbed to find that about 60% of a small group of probationer nurses did react to the Schick test. When a similar result was obtained with another small group, we decided to test a larger number of young adults. The results of this investigation, which was completed in 1939, are the subject of this short paper.

Materials and Methods.

The materials and methods have been described in another paper (Wilson and Goldsworthy, 1940). The young adults who are the subject of this report were 109 probationer nurses, who had been in training for not more than six months and had never entered the wards for infectious diseases, and 226 university undergraduates. All were within the age group eighteen to twenty-five years and none had been immunized against diphtheria. As has previously been stated, two tests were simultaneously performed on each subject—one with diphtheria toxin diluted in gelatin solution (the stabilized toxin) and another with the same toxin diluted in saline solution (the orthodox preparation). Only those subjects who gave similar results to both tests are included; they numbered 335.

Results.

The results are set out in Table I. Of the 109 nurses, 46% reacted; of the 226 undergraduates, 60% reacted. A few in each group (nine nurses and thirteen undergraduates) have been classified as "protein reactors" (Kelly *et alii*, 1925); that is, the sites of both the test and the control injections showed identical appearances during the whole period of observation (seven to ten days or more), so that the reaction to toxin could not be observed.

TABLE I.
The Schick Reaction in Nurses and Undergraduates.

Type of Reaction.	Nurses.	Undergraduates.
"Positive" (including pseudo-reactions)	50 (46%)	136 (60%)
"Negative" (including pseudo-reactions)	50	77
"Protein" reactions[1]	9	13
Total	109	226

[1] "Protein" reactions: certain subjects gave reactions at both sites (toxin and control). These reactions persisted for ten days or longer.

Discussion.

The results obtained by various authors up to 1923 have been collected by Andrewes *et alii* (1923) and they indicate that a reaction occurred in 20% of 4,049 subjects aged twenty years or more. Recent editions of standard text-books (Topley, 1933; Rosenau, 1935; Topley and Wilson, 1936; Zinsser and Bayne-Jones, 1937; Zinsser, Enders and Fothergill, 1939) quote and appear to emphasize figures of similar import (although some discuss also the question raised by reports of very wide deviations from such figures). Zingher (1923) found that a reaction occurred in only 7·8% of 705 males and in 16·6% of 548 females, aged twenty to thirty years. The corresponding percentages for persons aged forty to fifty years were respectively 5·8 and 9·9, as contrasted with 60·3 for city children (both sexes) aged five to six years.

But Zingher also found that the Schick test produced a reaction in 50% to 75% of nurses (often from country districts) in city hospitals. Apparently the

[1] Work done with the aid of grants from the Commonwealth Government and the National Health and Medical Research Council of Australia.

authors of many text-books have entirely ignored these last-mentioned figures, together with the reports of many observers who have shown that the test produced a reaction in relatively many more of the young adults in some communities than the 7·8% to 16·6% reported by Zingher. Some of the reported figures are shown, with our own, in Table II. Of the authors mentioned in this table, only one, Butler, obtained a figure similar to the 7·8% to 16·6% found by Zingher in the general population.

It appears, then, that the proportion of subjects who react to the Schick test among nurses and undergraduates, and some other occupational and social groups, is much higher than would be expected from statements in some standard text-books.

The Effect of Environment (Social Status).

A probable reason for the discrepancy is that most of Zingher's observations were made on subjects of the poorer classes living under unhygienic conditions in a crowded city (New York), where immunity (as judged by the presence of antibodies detectable by the Schick test) would have been readily acquired before adult life was reached. That this immunity is acquired in Australian cities too appears from the results obtained by Bull (1934), who found that the proportion of reactors to the Schick test among Melbourne children fell from 70% to 75% at five years of age, to 24% to 26% at fourteen years.

In contrast to the majority of the subjects observed by Zingher are the nurses, undergraduates *et cetera* observed by many authors, including Zingher himself (Table II). These latter groups are drawn largely from sections of the community which live under hygienic conditions. They are, therefore, according to generally accepted views, less liable to become immune with advancing age—that is, as a result of contact with virulent *Corynebacterium diphtheriæ*. Many in our groups, indeed, had been country dwellers or members of small communities before they entered the training school at the hospital or university.

The effect on the "Schick rate" of living in small or large communities has been studied by several authors. Diehl (1926) and Pulley and Fleisher (1938) have drawn attention to the higher proportion of reactors to the Schick test among students coming from smaller communities, as contrasted with the proportion among those from large towns.

The density of the population in the different parts of a large city varies considerably, and this is often (and perhaps generally) related to the social conditions in these different parts. Burnet *et alii* (1939) report some observations bearing on the connexion between the development of immunity and the social conditions. They found that various antibodies were more often detectable in persons from crowded districts of the city of Melbourne than in those living in the more open residential areas.

Table II.

Reaction to the Schick Test in Subjects within the Age Group 20 to 30 Years (approximately), as Reported by Various Authors.

Author.	Subjects Tested.	Number Tested.	Number of Positive Reactors.	Percentage of Positive Results.
Weaver and Rappaport (1916)	Nurses; students; internees	172	87	50·0
Garland (1921)	Nurses; a few physicians and hospital employees	350	195	55·7
Mulsow (1921)	Nurses	97	65	67·0
	Students	40	27	66·0
Cooke (1932)	Nurses	147	86	58·5
O'Brien *et alii* (1922)	Students	160	—	65·0
	Nurses	22	—	55·0
Kidder (1923)	Teachers (aged 20 to 44 years)	76	—	80·3
Zingher (1923)	Nurses	—	—	50–75
White (1923)	Nurses	658	—	52·3
	Students	—	—	77·0
	Teachers (country)	—	—	73·5
Ker and McGarrity (1924)	Maids	22	—	31·8
	Students	268	—	63·0
	Nurses	97	—	62·8
	Patients (aged 15 to 30 years)	686	395	58·0
Hooker (1924)	Nurses; students	500	299	60·0
Crooks (1925)[1]	Nurses; young doctors; students and 18 patients	752	532	70·7
Butler (1926)	Nurses; students; internees	89	13	14·6
Diehl (1926)	Students (including some in the age group 16 to 19 years)	8,089	—	52·0
Kelly *et alii* (1925)	Students	329	—	69·7
Young *et alii* (1934)	Patients in mental hospital	35	12	34·3
Bigger, quoted by Cauchi and Smith (1934).	Students	—	—	70·0
Brandon and Fraser (1936)	Students	87	—	38–64
Boynton and Ellis (1937)	Students	1,974	—	79·0
Fan (1937)	Chinese	514	228	44·4
Pulley and Fleisher (1938)	Students (with "clear" history)	590	233	39·5
Dwyer (1938)	Medical students	26	11 (18)[1]	42·0 (69)[1]
Thomson *et alii* (1940)	Students	243	171	70·0
	Militia	103	37	36·0
Thelander (1940)	Students	588	—	53·9
Bunch *et alii* (1940)	Students and nurses	226	90 (129)[1]	40·0 (57)[1]
Campbell (1941)	University students	405	—	59·0
	"Normal-school" students	243	—	80·0
	Civil servants	250	—	80·0
	Members of air force	250	—	55·0
	Members of air force	485	—	47·0
	"Trainees"	—	—	71·0
	Adults taken at random	558	—	87·0
Sellers (1941)	Air force trainees	2,246	—	52·1
	Air force trainees	5,377	—	55·9
Sellers (1942)	Air force trainees	8,561	—	59·1
Cadham (1942)	Medical students	738	—	40·0
Wheeler and Morton (1942)	City population (Halifax, under war conditions)—			
	Males aged 15 to 19 years	407	—	41·0
	Females aged 15 to 19 years	582	—	57·0
	Males aged 20 years and more	167	—	45·0
	Females aged 20 years and more	982	—	48·0
Anonymous (1942)	Medical students	368	—	79·1
Goldsworthy and Wilson (this paper)	Students	226	136	60·0
	Nurses	109	50	46·0
Cameron and Gibbard (1941)	Adults aged 18 to 61 years (80% were aged 20 to 49 years)	136	At least 63	At least 46·0
Cameron (1941)	Adults aged 18 to 61 years (80% were aged 20 to 49 years)	139	66	47·5
Wheeler and Morton (1942)	City population (Halifax, Canada, under war conditions)— adults aged 15 years and over	—	—	49·0

[1] Including pseudo-positive reactions.

Also, of 27 young adults whose blood was examined by them 18 had a diphtheria-antitoxin-titre below 1/50 antitoxin unit per cubic centimetre—that is, below the commonly accepted but possibly obsolescent "Schick level" (see Parish and Wright, 1938).

The Relation between the Schick Reaction and Immunity to Diphtheria.

The widely quoted results of Zingher's observations conform so conveniently to current views on pathogenesis and immunity in diphtheria, that conflicting figures for the incidence of reactions to the Schick test are likely to be ignored or explained as due to faulty observation, faulty test materials *et cetera*. While the current views may be in general acceptable for the age period from birth to fifteen years, the evidence collected in Table II seems to require some modification of these views if a satisfactory explanation of the observed facts is to be forthcoming.

First, any comparison of immunity to diphtheria as between adults and children should have as its basis an equal intensity of exposure to infection. It is precisely here that evidence is difficult to obtain (Doull, 1930). We may assume that in any given type of social environment, adults, with their better appreciation of the elements of personal and social hygiene, are less exposed to infection than are children, so that adults, even if their intrinsic susceptibility were the same as that of the children, would less often contract clinical diphtheria. Recently, however, in Halifax, Canada (*The Canadian Public Health Journal*, Volume XXXIII, 1942; Wheeler and Morton, 1942; Campbell, 1941; Maxcy, 1942; Morton, 1941), there has occurred an outbreak of diphtheria, in which many adults were attacked. The unusual incidence in the higher age groups may have been due to overcrowding of the population under rigorous winter conditions.

Further it is generally believed that nurses in hospitals for infectious diseases are more often clinically infected than other adults, although we have been unable to find Australian figures to support this belief. It may be that the facilities available for bacteriological investigation lead more often to the detection of *Corynebacterium diphtheriæ* in nurses suffering from sore throats (not necessarily true clinical diphtheria) than in the general population, so that the incidence of diphtheria is apparently higher in the nurses.

If now we assume that *Corynebacterium diphtheriæ* has equal chances of establishing itself (colonizing) in the throats of adults and children, what explanation is to be offered for the low incidence of (clinical) diphtheria in adults (see, however, Stimson, 1941) among the general population?

There is a distinction (Dudley, 1923; Weichsel, 1940). between (i) Schick immunity (failure to react to the test), (ii) antitoxic immunity (the possession of a certain arbitrary quantity of antitoxin in the blood), and (iii) clinically effective immunity (failure to acquire true clinical infection when exposed). In so far as a failure to react to the Schick test, or the possession of a certain level of circulating antitoxin, or a failure to react clinically to infection by *Corynebacterium diphtheriæ* after exposure, each seems to indicate immunity, the three coincide. But actually, there are discrepancies between these three aspects of immunity. In the first place, there is no fixed level of circulating antitoxin which corresponds to a failure to react to the Schick test; therefore some other factor must be involved. This factor is said to be the intrinsic reactivity or sensitivity of the skin to the toxin (Dudley *et alii*, 1934; Perla *et alia*, 1941). In the second place, there is a low incidence of (clinical) diphtheria among adults who react to the Schick test or possess minimal amounts of circulating antitoxin; it would seem necessary, therefore, in order to explain this fact, to invoke some other factor—for example, an antibacterial (as distinct from an antitoxic) mechanism (Schuman and Doull, 1940; Tevell and Fejes, 1937; Top, 1937; Wells, 1933; Frost *et alii*, 1936; Doull, 1930).

The Role of Antibodies in Immunity.

While the general importance of antibodies as factors in immunity cannot be denied, several reports (Peters and Todd, 1940) call attention to the apparent lack of relationship between circulating antibodies and effective protection against infection: in poliomyelitis (Burnet *et alii*, 1939; Burnet *et alius*, 1939; *The Journal of the American Medical Association*, Volume CXVI, 1941), in scarlet fever (Veldee *et alii*, 1941) and in influenza (Dalldorf *et alii*, 1941; Burnet *et alia*, 1942).

On the other hand, Tudor Lewis (1941) accepts the orthodox views as to the paramount importance of the antitoxin-producing mechanism in immunity to diphtheria. To explain the immunity of persons who nevertheless react to the Schick test, he advances the theory of latent immunization. According to his theory, a person may be "primed" by very slight contact with the *Corynebacterium diphtheriæ*—that is, his antitoxin-producing mechanism is put into a state of potential activity of preparedness without the actual production of detectable antitoxin, so that the subject continues to react to the Schick test. When exposed to the risk of clinically manifest infection, the primed mechanism responds rapidly and prevents clinical diphtheria.

Significance of the Schick Reaction.

From the foregoing discussion and from the results of inquiries (see Topley and Wilson, *loco citato*, pages 1098 *et sequentes*) into the incidence of clinical diphtheria respectively in persons who do and in those who do not react to the Schick test, we conclude: (i) that a failure to react indicates effective immunity in most instances; (ii) that a reaction to the test merely indicates that the subject possesses (again in most instances) not more than a certain amount of antitoxin in the blood, but does not indicate whether the subject has or has not a real or clinically effective immunity. Possibly, therefore, there is another protective mechanism which obviates the need for antitoxin—that is to say, a mechanism which prevents the *Corynebacterium diphtheriæ* from establishing itself in the body, and the Schick test cannot give any information on the existence of such antibacterial mechanism, specific or not.

It is certain that we know a great deal more about the antitoxic immunity than about any other kind of immunity in diphtheria, and for that reason it may have been allowed to assume an importance greater than it deserves. Be that as it may, the literature contains reports of many attempts to direct attention to the present impossibility of obtaining a complete picture of the reaction between *Corynebacterium diphtheriæ* and the human host, if we restrict the protective mechanism to antitoxin alone (Wells, 1933; Paschlau, 1938; Hammerschmidt, 1939; Frobisher and Parsons, 1943; Phair, 1942; Sordelli *et alii*, 1941; Fraser and Halpern, 1934; Frost *et alii*, 1936).

Summary.

One hundred and nine probationer nurses and 226 undergraduates, who had not suffered from diphtheria and had not been immunized against it, were Schick tested. Of the nurses 46% and of the undergraduates 60% reacted to the Schick test. Similar results have been reported by many others.

The proportion of reactors to the Schick test among nurses and undergraduates is much higher than would be expected from the statements in the latest editions of some standard text-books. A probable reason for this discrepancy is discussed.

Some aspects of the problem of immunity towards diphtheria are briefly discussed.

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FLUORESCENCE MICROSCOPY FOR THE DETECTION OF THE TUBERCLE BACILLUS.

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FLUORESCENCE MICROSCOPY has been in routine use in certain medical centres in Europe for a number of years, and various optical firms have marketed special apparatus for this type of examination. Owing to the high cost of the earlier equipment and to the prevailing war conditions, the use of the fluorescence method, despite encouraging reports of its value, has not as yet spread widely.

As the name indicates, this type of microscopy depends on the phenomenon of fluorescence—that is, the ability of a substance to absorb light energy of a certain wave length and convert it to a wave length different from that of the exciting rays but characteristic for the fluorescent material. The object examined may either be naturally fluorescent, or, more usually, be saturated with a fluorescent dye or fluorchrome. Ultra-violet light is used as the exciting source, and the resulting fluorescence occurs in some part of the visible spectrum, depending upon the fluorchrome used. Ellinger[1] in a lengthy article has described the application of the fluorescence method to microscopic work in numerous biological fields, and in many of them it appears to have an important future.

In the detection of the tubercle bacillus, the application of the method is simple. A suitable preparation is stained with the fluorescent aniline dye auramine and then treated with a solution of acid alcohol. The tubercle bacillus, in common with other acid-fast organisms, retains the dye, while the rest of the preparation is decolourized. When the smear is subjected to a beam of ultra-violet light and all visible light is excluded, the stained bacilli become fluorescent and are seen, through a suitable ocular filter which absorbs ultra-violet and passes visible light, as yellow rods on an almost black background.

The chief advantage of the method is that it reveals an increased number of "positive" smears as compared with the Ziehl-Neelsen technique, hence reducing the number of sputum concentrations and cultural examinations usually required. The increased delicacy of detection of bacilli is due mainly to the brightly fluorescent organisms contrasting sharply with the dark background; this enables the lower powers of magnification of the microscope to be used, with a corresponding enlargement of the microscopic field. An oil immersion lens is not required, dry objectives giving magnifications of only 200 to 400 diameters being sufficient for purposes of location and identification. According to Bogen,[2] with this low magnification it is theoretically possible to examine every part of a smear in less than twenty minutes with the fluorescence microscope, in comparison with the eight or more hours required with the usual oil immersion magnification. Richards, Kline and Leach[3] have shown that the carbolauramine solution stains more tubercle bacilli per preparation than does the carbolfuchsine solution of the Ziehl-Neelsen method. Richards[4] suggests that this is due to the fact that carbolauramine forms a much firmer combination than carbolfuchsine with mycolic acid, the substance demonstrated by Stodola, Lesuk and Anderson[5] to be the acid-fast portion of the tubercle bacillus.

A further advantage of the fluorescence technique is that the staining of preparations is simple and rapid, no heating or counter-staining being required. Richards and Miller[6] found that one-quarter to one-third less time was required for preparing and reading smears by this method.

Finally, owing to the wider field surveyed, a better idea of the total number of organisms in the smear is obtained.

Many workers have reported on the superiority of the method. Papers by Hermann,[7] Didion,[8] Gartner,[9] Kuster,[10] Besta,[11] Schneider,[12] Thomassen,[13] Larsen[14] and Oscarssen,[15] dealing with the examination of large numbers of specimens of all kinds, emphasize the increased delicacy of detection of bacilli by this technique and the saving of time and fatigue.

The fluorescence method has also been employed for the examination of tissue sections containing *Mycobacterium tuberculosis*. Schallock[16] and Tanner[17] recommend it for this purpose.

As has been mentioned earlier, the equipment originally used for fluorescence microscopy was expensive and hard to obtain; but Keller has since then shown that an ordinary type of lamp may be used, and Richards and Miller[18] have recently described a simplified apparatus suitable for routine work with a monocular microscope. A reference to its use has already been made in the journal.[1] It has been demonstrated that the original quartz condensing lens system is unnecessary, as the ordinary microscopic condenser passes enough of the longer waves of the ultra-violet spectrum to cause auramine to become fluorescent. Using as a light source a low-voltage, high-amperage, concentrated filament lamp, as first employed by Keller, in place of the mercury vapour arc, and adding suitably balanced filters, Richards has produced an apparatus now available commercially in the United States of America. Using this model, Richards and Miller,[6] Richards, Kline and Leach,[3] Bogen[19] and Thompson[20] state that they have obtained favourable results.

The equipment for fluorescence microscopy described by Richards is not at present available in Australia. He recommends[4] the use of a "Spencer Universal Microscope Lamp" with a clear bulb and closely coiled filament operating on 2·75 amperes at 6·5 volts from a transformer; he usually operates the lamp on a voltage of about 7·0 to 7·5. This lamp is used in conjunction with a blue ultra-violet transmitting filter, which passes waves in the ultra-violet region from below 3,650 to about 4,500 Angström units (see diagram). A mirror coated with aluminium replaces the usual silvered one on the microscope. A compensating yellow filter in the ocular transmits only in the visible spectrum from about 5,000 to 7,000 Angström units.

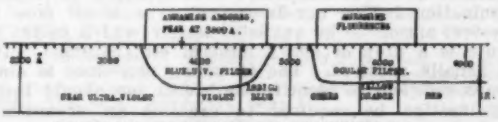

DIAGRAM OF ELECTROMAGNETIC SPECTRUM IN U.V. AND VISIBLE REGIONS.

As the result of a search for equipment available locally, and with the valuable collaboration of Dr. John Hunter in the experimental work necessary, there has been devised in the laboratory of this sanatorium an apparatus which has proved suitable for fluorescence microscopy. The source of ultra-violet light is an ordinary commercial "black lamp" operating from the alternating current mains with a choke and condenser. The lamp consists of a straight quartz mercury vapour tube, which under operating conditions acts as a powerful source of visible and ultra-violet light. The lamp has an additional

[1] THE MEDICAL JOURNAL OF AUSTRALIA, January 10, 1942, page 50.
[2] Personal communication.

advantage in that it carries its own filter, being surrounded by an evacuated bulb of Wood's glass, which eliminates most of the visible light, excepting some red rays, but passes the ultra-violet rays. This lamp is said to give out 90% of its ultra-violet radiation at a wave length of 3,650 Ångström units, which is sufficiently high in the ultra-violet band to pass through ordinary glass. A flask of copper sulphate solution of a concentration just sufficient to absorb all interfering red rays acts as a further filter and condenser. This flask should not be made of "Pyrex", as the latter is slightly fluorescent. Wood's glass is not an ideal filter for this type of work, and a blue ultra-violet passing filter of the kind specified by Richards and Miller[6] would be more efficient. This filter, however, is not obtainable locally. A good substitute for it, in liquid form, can be made without much difficulty by building a glass cell of a thickness of about 0·5 centimetre, or by using a flat-sided bottle and filling it with a saturated solution of copper sulphate, to which has been added liquid ammonia in just sufficient quantity to dissolve the precipitate first formed. The solution in the cell is then carefully diluted until the most satisfactory microscopic field is obtained. Such a filter probably passes waves only in the region of 3,500 to 4,800 Ångström units. Used in conjunction with the bare quartz tube of an ordinary mercury vapour lamp (the outer frosted cover being removed) and fitted with a condensing lens of any appropriate type, it gives good contrast and illumination, but is somewhat more troublesome to fit up than the straight-out "black lamp". The beam is then reflected through the condenser of the microscope from a plane mirror coated with aluminium. The ordinary silvered mirror is not suitable, as it absorbs a good deal of the ultra-violet light. The aluminium-coated mirrors, which are made by a special process, are available locally. A thin gelatin photographic filter (Ilford Delta 109) is placed on the diaphragm of the ocular. This filter absorbs wave lengths below 5,200 Ångström units, and therefore prevents all undesirable ultra-violet and blue light from reaching the eyes. Condensers will be found to vary in the degree to which they are fluorescent. Balsam used in cementing lenses is noticeably fluorescent. Richards recommends the use of the regular Spencer Abbe N.A. 1·25 medical two-lens condenser, as it has no cemented lenses. Similarly, achromatic objectives are preferable to apochromatic objectives, as fluorite is also fluorescent.

The tubercle bacilli can be located with the ordinary low power of the microscope, and they can be accurately identified with a higher power objective as thin, bright, golden-yellow, slightly curved rods. The higher power objective should be either an eight-millimetre objective used with a 20 X eyepiece or a four-millimetre objective with a 5 X or 10 X eyepiece. The four-millimetre objective should have a numerical aperture of 0·85 instead of the usual 0·66, in which the available light is greatly reduced. A drop of non-fluorescent sandalwood oil placed between condenser and slide has been recommended to increase the illumination. This non-fluorescent type of oil does not, however, appear to be available locally, and a useful substitute is a drop of heavy mineral oil (paraffin). It is not usually required. The foregoing procedure is almost always sufficient to identify the bacilli, but should further magnification be required to examine an organism of atypical shape, the ordinary oil immersion lens may be used with a 5 X ocular and with the usual drop of cedar-wood oil on the slide. As Lind and Shaughnessy[10] point out, the oil becomes fluorescent and appears as a dull yellow haze; but this also blots out the definite outlines of associated interfering fluorescent substances, while the tubercle bacilli remain bright and clear-cut. With the oil immersion lens the point of focusing area or working distance is very narrow. Graham[20] recommends the use of methyl salicylate (oil of wintergreen) as an excellent non-fluorescent immersion oil with a high refractive index. Such samples as have been obtained here, however, appear to be slightly fluorescent. When the oil is used as immersion oil, the background remains satisfactorily dark and focusing is easy, but the bacilli do not appear to be quite so bright and definite as with cedar-wood oil.

Slides should be examined in a darkened room, and the eyes should be adapted for a brief period before the examination. The mercury arc lamp should be switched on for a few minutes before the examination begins, as it takes a short time to reach maximum output of ultra-violet light. Smears should be examined soon after they are stained, as they are then at their brightest and tend to fade after some hours on the bench. They can be restained, however, at any time if necessary.

With apparatus similar to that described above, 500 duplicate smears of sputum were examined, with the results shown in Table I.

TABLE I

Routine Examination of 500 Sputum Smears.

Method.	Positive Results.	
	Number.	Percentage.
Fluorescence microscopy	299	59·8
Ziehl-Neelsen technique	236[1]	47·2
Difference	63	12·6

[1] Two specimens, which gave positive results with the Ziehl-Neelsen technique, gave negative results to fluorescence microscopy.

In addition to its producing over 12% more positive results, another factor of importance in the use of fluorescence microscopy was the saving of time in the staining and examination of the slides. The stained bacilli usually stand out clearly, and with the lower powers of the microscope a minimum of focusing is needed in passing from field to field. It will be noted that two specimens gave positive results to the Ziehl-Neelsen technique and not to fluorescence microscopy, but this can be explained on the grounds of chance distribution of small numbers of bacilli or of technical error, and similar findings have been noted by many observers.

The foregoing apparatus, using a 125 watt lamp, gives satisfactory results with the ordinary monocular microscope and can easily be utilized in any laboratory. Graham[20] recommends the use of a tungsten filament 500 watt G.E. projection lamp operating on 110 to 115 volts; but Richards finds that this lamp is no brighter than the mercury vapour type and that it causes preparations to fade very rapidly. A lamp similar to that used by Richards has been tried by us, but has not given such good results as the mercury vapour lamp.

A little practice is necessary to make a mental adjustment to the new size, colour and brightness of the organism as seen at lower magnifications in a larger field.

The method at present must be confined to monocular microscopes, as no lamp is yet easily available which will give sufficient light for a binocular instrument.

To date, a numerical assessment of the advantages of the fluorescence method has been made only with samples of sputum. The comparative examinations of other samples containing *Mycobacterium tuberculosis* have not been sufficiently numerous to justify publication; but the new method seems more sensitive in the examination of pleural fluid, cerebro-spinal fluid, urine and tuberculous pus. In the examination of concentrates, both from sputum and from gastric contents, difficulty arises owing to the large amount of extraneous fluorescent material, and the difference between the two methods is less pronounced.

The staining technique consists simply of covering the smear with auramine solution for three minutes, washing with tap water and "destaining" with two lots of acid alcohol for periods of five to ten minutes. Some preparations require longer "destaining" to reduce the fluorescence in the background. A moderate number of specimens of sputum contain mucus or other protein material which is itself fluorescent, and these cannot be fully "destained". If this is particularly troublesome, Graham[20] suggests counter-staining by the method of Herrmann; that is, counter-stain the preparation for a few seconds with a

solution of 0·1% potassium permanganate followed by a few seconds' application of Löffler's methylene blue. This changes the cells to a dark blue and they therefore become invisible, creating a perfectly black background. Complete "destaining" is not possible for sputum treated with cresol, as this substance is fluorescent. Autoclaving will greatly reduce the number of organisms seen.

The strength of the auramine stain may vary from 0·05% to 0·5%. The stain originally recommended by Richards, Kline and Leach[3] consisted of a 0·3% solution of auramine O in a 3% solution of liquefied phenol in distilled water. This gives a cloudy solution, which, however, works satisfactorily; but if much reddish material appears on the surfaces of the smear it is as well to filter the stain before use. A modification to overcome this cloudiness has been suggested by Thompson,[10] who prepares two solutions: (*a*) phenol (liquefied), three cubic centimetres, in 87 cubic centimetres of distilled water; (*b*) alcohol (95%), ten cubic centimetres, in which is dissolved 0·1 gramme of auramine O. When solution (*a*) is well mixed and the dye is thoroughly dissolved in solution (*b*), both solutions are mixed, a clear yellow fluid free from precipitate being obtained. Auramine is unstable to heat and light and should be kept in a dark bottle. The prepared stain will keep for at least two weeks, but should be discarded as soon as the fluorescence on the smear appears less bright. Its potency can be checked regularly by the staining of a known "positive" smear.

The reagent used in the fluorescence method is actually auramine O, the hydrochloride salt of di-phenyl methane or auramine, the mother substance of a number of important aniline dyes. The stain is used extensively in the dye trade and is available locally as auramine O (standard).

The "destaining" solution recommended by Richards, Kline and Leach[3] consists of 0·5% hydrochloric acid (concentrated) and 0·5% sodium chloride in 70% alochol. Thompson[10] has found that if the amount of acid is increased to 1% decolourization is improved.

In addition to the detection of the tubercle bacillus, the fluorescence method has been employed in examinations for many other organisms. Ellinger[1] quotes Barnard as having in 1937 with good results examined the virus bodies of foot and mouth disease and vesicular stomatitis with the fluorescence microscope. Richards and Miller[6] state that Hagemann found the fluorescence method to be satisfactory for staining trypanosomes and spirochætes. Richards, Kline and Leach[3] quote Keller as reporting that he found the dye, coriophosphine-H, suitable for the fluorescent observation of diphtheria bacilli. The fluorescence of these was green with a brick-red granule, while that of the pseudo-diphtheria bacilli was a pale yellow. Kuster[10] found auramine suitable for staining leprosy bacilli and also for staining diphtheria bacilli. He considered it a better differential stain for the latter than Neisser's stain. Henderson, Spaulding and Gault,[11] who used the method in the separation and concentration of acid-fast organisms from the tissues of leprosy patients, state that the fluorescence technique is clearly superior for demonstrating globi and leprosy bacilli. They also quote Kline and Leach as emphasizing the suitability of the method for leproma smears. Much further investigation, however, is apparently needed before the practical usefulness of the method for the detection of organisms, other than the tubercle bacillus, is established.

Summary.

1. Fluorescence microscopy is recommended as a more rapid and sensitive method than the Ziehl-Neelsen technique for the detection of *Mycobacterium tuberculosis* in samples of sputum.

2. An apparatus for the use of this method, built from materials available locally, is described.

Acknowledgements.

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Reports of Cases.

THREE CASES OF POISONING BY IRRESPIRABLE GASES: PHOSGENE FROM TRICHLORETHYLENE, NITROGEN DIOXIDE, CARBON DIOXIDE WITH REDUCTION OF OXYGEN.

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In the course of some two thousand post-mortem examinations ordered by the Brisbane City Coroner during a period of seven years, there were three cases in which death

was due to the accidental breathing of irrespirable gases. These were in addition to the fairly frequent suicidal and accidental deaths from inhalation of carbon monoxide.

The case of poisoning from phosgene produced by the inhalation of trichlorethylene through a burning cigarette illustrates an industrial hazard that should be kept in mind, for trichlorethylene is used extensively as a cleanser for metal parts and clothing.

Phosgene and nitrogen dioxide (or "nitrous fumes") have very similar actions on the body. Both gases are important in military practice; the former was deliberately used in the war of 1914-1918; the latter is a danger to personnel when bombs or shells explode in confined spaces. The present case shows that nitrogen dioxide can also be a risk to civilians using explosives.

The combination of carbon dioxide with reduction of oxygen is well known to miners under the name of "black damp". The patient in this case was asphyxiated in a fermentation vat. A number of such cases is on record.

Case I: Poisoning by Phosgene from Trichlorethylene.

Clinical Record.

F.H., aged twenty-six years, had been a dry cleaner for three months. The room in which he worked contained two "Burtol" plants, each consisting of washer, hydro and rotary tumbler. The procedure was to place the garments, about nine at a time, in the washer, which was then closed. When a valve was opened, trichlorethylene flowed in. The washer was rotated for ten minutes; it was then opened and the garments were removed. They were dried, first centrifugally in the hydro and then in the tumbler in a current of air from a six horsepower fan. The maximum exposure of the operator to the fumes of trichlorethylene would occur each time the washer was opened to transfer the garments to the hydro. This operation would take about a minute.

On October 30, 1940, F.H. attended his machines as usual throughout the day until 4 p.m. He then left the dry cleaning room in good health. Subsequently he changed a "flat" motor tire, then he changed his clothes, and about 5.30 p.m. he left the works to take the motor-car to his employer. Before he left he was laughing and talking with the foreman.

He had driven a few hundred yards when he became suddenly ill. He had time to turn the engine off before collapsing. After a short, erratic course the motor-car came to rest against a fence. The driver was noticed to be unconscious, leaning back on the seat with his head thrown back. It is not clear whether he died at that time or shortly afterwards in the ambulance on the way to hospital. The time of death would not be later than 5.45 p.m.

Post-Mortem Findings.

A post-mortem examination was made next morning by Dr. G. S. Hayes. The lungs were intensely œdematous in all parts. They were like filled sponges, and when they were cut fluid poured out. The bronchi were full of frothy fluid. There were about two and a half ounces of clear fluid in each pleural cavity. The right auricle was distended with blood; the liver and kidneys were congested. The other organs appeared normal.

Mr. T. McCall, of the Government Analyst's Department, examined the lung tissue and found a "volatile organic chlorine compound" present. This he found also, but in a low concentration, in a jar containing the stomach and its contents, and in a jar containing portions of liver, spleen and kidney.

Microscopic examination of a portion of lung tissue revealed that the capillaries in the alveolar walls were dilated and engorged with blood. Many alveoli were full of blood; some were filled with clear fluid containing a variable number of red cells. A minority of alveoli were filled with air; many of these were very distended; in many instances the walls were ruptured, several alveoli being thrown together. The bronchioles contained blood. There was no sign of acute inflammatory reaction. (The large amount of blood rather than œdema fluid in the alveoli suggests that the portion of lung selected for section happened to include an ecchymosis.)

Examination of the liver revealed a regular lobular pattern. The sinusoids were congested, with here and there a small group of polymorphonuclear leucocytes. Examination of a frozen section stained with Scharlach R revealed fine granules of fat in many liver cells and occasionally larger droplets. There was no sign of nuclear degeneration. Examination of sections of heart, brain and kidney disclosed no abnormality. No fatty change was demonstrable in sections of heart and kidney stained with Scharlach R.

Discussion.

Trichlorethylene or trichloroethylene ($CHCl:CCl_2$) is a colourless liquid with a boiling range of 86° to 88° C. and a specific gravity of 1·47. When inhaled in sufficient concentration, it has a narcotic action similar to that of chloroform. It has, in fact, been used as a general anæsthetic agent in a series of 127 operations.[1] The narcotic action appears at a concentration of about 10,000 parts per million, and two and a half times this concentration is fatal.[2] Narcotized animals recover rapidly after removal from exposure to the gas.

An investigation of the dry-cleaning room in the case under discussion revealed that ventilation was inadequate. A calculation based on the loss of trichlorethylene by evaporation in the cleaning room, together with the capacity of the fan, indicated the average concentration of trichlorethylene vapour in the air of the room to be 488 parts per million. Although the average concentration is well below the narcotic figure of 10,000 parts per million, the concentration would be greater when the clothes were being removed from the machine, and it would vary from place to place in the room.

One would expect that a workman overcome with trichlorethylene fumes would become drowsy or unconscious, and that these symptoms would appear during the time of exposure. The manager recalled that on two occasions when the fan was not working well a previous operator had become drowsy. After a sleep of a couple of hours he woke up and was then quite alert. Otherwise there had been no untoward effect on the operators in the two years since the machines were installed.

In the case of F.H., the victim was symptomless when he left the affected atmosphere and died suddenly about one and a half hours later; the phenomena do not fit in at all with the direct action of trichlorethylene.

Although trichlorethylene is considered non-inflammable, it will decompose at high temperatures. If air containing the vapour comes in contact with flames, welding arcs, certain hot surfaces or burning tobacco (as when drawn through a lighted cigarette) the trichlorethylene may be decomposed with formation of phosgene.[3] F.H. was an inveterate smoker, consuming forty cigarettes a day. Usually he went out of the dry cleaning room to smoke, but at least half a dozen times he was seen smoking in the room. He was repeatedly warned about this by the foreman, by whom the danger was well recognized.

Phosgene poisoning gives quite a different clinical picture from trichlorethylene narcosis. The delayed action, the severe pulmonary œdema, and the rapidly fatal collapse seen in this case are in complete accord with the action of phosgene. There can be no doubt that the death of F.H. was due to phosgene, produced by the inhalation of trichlorethylene through burning cigarettes. The exertion of changing the motor-car tire might well have accelerated death.

The deaths of two dry cleaners using trichlorethylene are reported in the Annual Report for 1939 of the Chief Inspector of Factories in England. An abstract (unfortunately the original is not available) reads as follows:[4]

> Trichloroethylene.—Nine cases, two of them fatal, are recorded. In one of the fatal cases an apparently healthy man, who for a long period had been exposed to trichloroethylene fumes in a dry-cleaning establishment, was found, 40 minutes after he had left work, in a comatose condition and died before reaching home. In the other case a youth of 17, employed by a dry cleaner, was found in his bedroom in a dying condition.
>
> These cases are regarded as important because, if it is accepted that the effects of a volatile anæsthetic become progressively less in inverse ratio to the time that has elapsed after the inhalation, then simple acute anæsthesia cannot be accepted as the cause of these deaths. It would seem that there must have been either some delayed action peculiar to the particular chemicals, or some changes produced in vital organs during a recent acute exposure, and that the results did not show until a later period, possibly accelerated by exertion.

Clearly the same mechanism was at work as in the case of F.H.

Case II: Nitrogen Dioxide from Gelignite.

Clinical Record.

J.P.D., a male, aged nineteen years, was a labourer employed on a farm at Wellington Point, Queensland. He was a well-developed youth and had had no serious illnesses. For about ten days before his death, he had been assisting

his employer to make a horizontal drive from the bottom of a well, which was twenty-four feet in depth and contained about a foot of water. The drive was five feet three inches in height, three feet wide and about twenty feet in length. In its construction gelignite charges had been used.

On February 27, 1940, the employer bored in the front of the drive two holes, each two feet in length and two inches in diameter. Three gelignite cartridges (seven-eighths of an inch in diameter) were placed in each hole. Fuses were attached and the holes were then plugged. The first fuse was lighted, but before the second fuse could be lighted the carbide lamp was extinguished. The employer then came to the surface. The charge fired. A motor pump was then started in order to evacuate fumes from the bottom of the well.

One hour later, at 2 p.m., when the well appeared to be free of fumes, the patient descended the well to light the second fuse. He cut an inch off the fuse, lighted it with some difficulty, and came to the surface. The exact duration of his exposure is not known.

The patient weeded beetroot for the remainder of the afternoon. He appeared to be quite well, but before he ceased work at 5 p.m., he complained of a headache. The headache was still present at 7.15 p.m., when the patient had a light meal, after which he sat with his father until 9.15 p.m., when he went to bed. At 10 p.m. the father noticed that the patient was restless, and he heard him vomiting at 10.15 p.m. At 3.30 a.m. the patient was groaning and appeared to be breathing with difficulty. The patient's father thereupon telephoned Dr. G. R. Poole, of Cleveland, who advised that the patient be taken to hospital immediately. The patient became unconscious at 5 a.m. and died in the Mater Misericordiæ Hospital, Brisbane, at 8.30 a.m. Whilst he was in the hospital, the patient had pronounced dyspnœa in spite of continuous oxygen therapy.

Post-Mortem Findings.

A post-mortem examination was performed at 11.30 a.m. on February 28, 1940. There were no marks of injury on the body. Greenish froth was exuding from the nostrils. The lips, face and mucous surfaces were pale, but the finger nails were slightly cyanosed. There was no conjunctival congestion.

The larynx and trachea were filled with reddened froth, the blood apparently being due to an acute inflammatory condition of the upper respiratory tract. The lungs were voluminous with large dark areas of hæmorrhage on the pleural surfaces, as if alveoli had recently ruptured and filled with blood. Both lungs were markedly œdematous. Examination of microscopic sections of the lungs revealed acute inflammation of the terminal bronchi and the bronchioles with desquamation of epithelium in parts. Widespread rupture of alveoli, extravasation of lymph, and infiltration with polymorphonuclear leucocytes, particularly around the bronchioles, had occurred.

The heart was dilated. All chambers of the heart, as well as the large veins, were filled with dark clotted blood. Examination of the spleen and kidneys revealed intense congestion, and the liver surface had a mottled, toxic appearance. Microscopic examination of sections of the kidney revealed patchy tubular necrosis, with congested blood vessels. Microscopic examination of sections of the liver revealed dilatation of central vessels, central cloudy swelling and pronounced separation of columns of hepatic cells. The bladder was full. The urine was amber-coloured, had a specific gravity of 1,024, and contained traces of glucose, acetone and albumin. No carboxyhæmoglobin was detected by spectroscopic examination of the blood.

Analysis of Well Gas.

As an examination of the well gas was considered desirable, arrangements were made with the Government Analyst at that time (Mr. F. E. Connah, F.I.C., A.A.C.I.) to have this performed. Accordingly Mr. V. R. Cundith, B.Sc., descended the shaft at 7 p.m. on February 28, about twenty-nine hours after the charge had been fired.

Analysis of the well gas gave the following results:

Hydrogen sulphide: nil.
Carbon monoxide: 0·05%.
Carbon dioxide: 5% (approximately).
Oxides of nitrogen: present, less than 1 part in 100,000.

The air did not support combustion.

The Government Analyst's report further stated that, owing to the long interval elapsing between the firing of the charge and the analysis, the presence of oxides of nitrogen in proportions below the toxic limits could only be expected, as diffusion had occurred and the gases were very soluble in water. Their presence in the air of the drive at the time of analysis was an indication of a probably dangerous condition of the air one hour after the firing of the charge.

Discussion.

Oxides of nitrogen are formed during the incomplete detonation of nitro-glycerine explosives. Factors favouring incomplete detonation are poor quality of explosive, inefficient detonators and an excess of air around the explosive charge. In this instance it would appear that, by the placing of a gelignite cartridge seven-eighths of an inch in diameter in a hole two inches in diameter, there would be an excess of air around the charge leading to excessive formation of "nitrous fumes". These fumes consist of a mixture of nitric oxide (NO), the dioxide (NO_2) and its polymer (N_2O_4). The nitric oxide is oxidized immediately to nitrogen dioxide. In addition to oxides of nitrogen, carbon monoxide is formed. Both nitrogen dioxide and its polymer are toxic. Gonzales[5] states that inhalation of a concentration of 0·6 to 1·0 milligramme in a litre of air may cause rapid death, whilst greater dilutions may be distinctly dangerous. The fumes are yellowish-brown in colour, with an acrid odour, and are irritating to mucous membranes.

McNally[6] recommends that the term "nitrous fumes" should be eliminated from all text-books, as it is inaccurate and causes confusion with nitrous oxide. His suggestion is a sound one.

The patient described above showed the classical symptoms and signs. After his exposure to fumes of nitrogen dioxide, there was a latent period of several hours, followed by vomiting, dyspnœa, coma and death from pulmonary œdema.

Case III: Carbon Dioxide Combined with Oxygen Lack.

Clinical Record.

W.D., aged twenty-six years, was employed at a chutney factory. At 8.45 a.m. on July 4, 1936, he went into a vat, which had been used for storing fermented malt, to clean it. This vat was cylindrical, about seven feet across and twelve feet high. The wooden cover contained a manhole. At 10 a.m. he was missed, and a search found him lying supine at the bottom of the vat. There was fluid in the vat to a depth of about three inches; his nose and mouth were above this. It was necessary to break up part of the wooden cover to get him out. The two men who went down into the vat were almost overcome and came up blue and exhausted, even though they stayed down only about a minute.

W.D. had begun to clean vats only a short time before. Previously a man had been performing this work for eighteen years without ill effect.

Post-Mortem Findings.

A post-mortem examination was made at 12.30 p.m. the same day. The subject was seen to be a sturdy muscular young man. There was great congestion about the neck and the upper part of the thorax. The blood was very dark and fluid. Petechiæ were present in the epicardium over the left ventricle and in the submucosa of the upper part of the œsophagus. Subpleural ecchymoses were present. The lungs were slighly congested. The bronchi contained a little froth. There was no smell of vinegar in the mouth or respiratory tract. A dilution test of the blood did not disclose the presence of carbon monoxide.

Investigations and Discussion.

The production of vinegar takes place in two stages. In the first, malt and cane sugar in solution are fermented by yeasts to produce a solution of alcohol. In this process carbon dioxide is liberated:

$$C_6H_{12}O_6 \rightarrow 2CH_3CH_2OH + 2CO_2$$

The dilute solution of alcohol is then pumped over slats of wood or shavings (to give free access of air) and the acetous ferment changes the alcohol to acetic acid:

$$CH_3CH_2OH + O_2 \rightarrow CH_3COOH + H_2O$$

The vat in question was one in which fermented malt was stored during the period between the two fermentations.

An examination of the vat was made two days after in conjunction with Dr. W. J. Wiley and Mr. V. R. Cundith, of the Government Analyst's staff. During the week-end which intervened the vat had been loosely covered with boards. (It is unfortunate that no examination of the vat was possible immediately. The composition of fluid and atmosphere could have altered considerably in the two days that elapsed.)

The vat was found to contain three inches of a thick grey liquid. This consisted of a suspension of yeast cells in

a liquid from which most of the sugar had been fermented; alcohol fermentation had ceased. There was a smell of acetic acid in the vat, which became very strong and unpleasant near the bottom. An analysis of the air in the vat showed less than 1% carbon dioxide and less than 0·01 gramme of acetic acid per litre. The analyst who collected samples of fluid and air showed no cyanosis or dyspnœa during his brief stay in the vat.

Although the vat was used for storage, both fermentations were probably going on in the small amount of fluid left in it. It is likely that the last traces of sugar were being fermented to alcohol, and that the acetous fermentation had begun. Both processes would render the air unsuitable for respiration. The first would produce carbon dioxide; the second would abstract oxygen. Death is ascribed to a combination of these two factors.

Acknowledgements.

We are indebted to Dr. J. Coffey, Deputy Director-General of Health and Medical Services, Queensland, for permission to publish these reports, and to the gentlemen mentioned in the text for their assistance.

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(4) "Industrial Diseases in 1939", abstracted in *The Medico-legal and Criminological Review*, July, 1941, page 155.
(5) T. A. Gonzales, M. Vance, M. Helpern and H. S. Martland: "Legal Medicine and Toxicology", 1937, page 468.
(6) W. D. McNally: "Toxicology", 1937, page 406.

Reviews.

SURGERY OF MODERN WARFARE.

A year after the completion in separate parts of the first edition of the "Surgery of Modern Warfare" the second edition, now in two bound volumes, made its appearance.[1][2] As before, the names of the 72 contributors—for some new names are added to the list of those responsible for the first edition—are those of leading authorities in their various spheres. An appendix is once more included, in which brief reference to the most recent work and writings is made, much of the matter contained in the appendix to the first edition having been incorporated in the text.

Some rearrangement in the order of presentation has been made; for example, the chapter upon the bacteriology of war wounds occupies an earlier and more logical place, and more of the illustrations are in colour. In the rearrangement mentioned it is interesting to find that the chapter on blood substitutes (plasma and serum) now precedes that on blood transfusion. This latter chapter, it may be again remarked, is of the greatest value for its wealth of detail concerning procedure and technique in the taking, testing and giving of blood. If any criticism of it is possible, it is that more emphasis might be laid upon the risks associated with the use of stored blood. The new methods of transfusion and infusion, by which the *corpus cavernosum* or the bone marrow route is used, are now included in the general text.

It is gratifying to find, in the chapter on the general treatment of wounds, that the faulty use of the term *débridement* has ceased and that now a clear distinction between this procedure and true wound excision has been drawn. It is noted with equal regret, however, that a chapter is still devoted to the radiological treatment of gas gangrene, although evidence has now been adduced that the method is without value in true clinical gas gangrene, as distinct from mere gas cellulitis.

Developments in the field of chemotherapy have been so rapid that time lag alone prevents the inclusion of the last word about it, even when the contributor of the article is the eminent authority Thrower, consulting physician to May & Baker, Proprietary, Limited. In future editions, no doubt, more stress will be laid upon the renal complications which may arise during treatment by the sulphonamides.

In the section dealing with wound treatment and wound dressing at a later stage, the introduction of new material is noted—the question of the part played by avitaminosis, dietary and œdema of the tissues in relation to healing. The statement is made that acriflavine in emulsion form is quite without antiseptic value.

The excellent discussion of the important subject of secondary hæmorrhage is reproduced as in the original text, except that a footnote, with which most surgeons will be in agreement, has been added.

In the discussion of the treatment of those abdominal wounds in which extensive parietal destruction has occurred, Ogilvie describes his method of utilizing fabric treated with "Vaseline". He points out that confusion may arise in such cases through an associated crush injury leading to vomiting of uræmic origin. The risk of interference with blood chemistry from long-continued intravenous therapy with saline solution is stressed.

Space is given in the chapter on the anæsthetizing of the wounded to new agents and apparatus, including the Oxford vaporizer, and attention is drawn to the multifarious duties that may have to be undertaken by the anæsthetist under war conditions; the whole subject is discussed in eminently practical fashion. Entirely practical, too, is Wakeley's handling of the subject of burns, with the treatment of which he has identified himself so closely. This chapter has been enlarged as is its due, and concludes with a full description of the Bunyan bag method of treatment. Frost-bite and trench foot, with the present-day analogue "immersion foot", receive extended consideration from every angle.

The chapter upon injuries of the peripheral nerves, now contributed by Seddon, will be welcomed as most informative and helpful by all those called upon to treat these injuries. An equal appreciation will be extended to the writers, Mouatt and Tudor Hart, of the chapter which follows, upon tendon injuries, in which principles and operative technique are fully and clearly set forth.

In the other chapters which deal with what may be termed more static subjects, little variation from the text of the first edition may be evident, for obvious reasons.

The appendix contains, as before, a number of short notes from the recent literature covering a wide range of subjects. Evidence is brought forward here that the old controversy as to the merits and demerits of Syme's amputation can be by no means taken as settled. Such an inclusion can be taken as token of that continued search after what is best, both in the old and in the new, which ensures this work a place of honour in our libraries.

[1] "Surgery of Modern Warfare", edited by Hamilton Bailey, F.R.C.S.; Volume I, Second Edition; 1942. Edinburgh: E. and S. Livingstone. Crown 4to, pp. 496, with 375 illustrations. Price: 40s. net.

[2] "Surgery of Modern Warfare", edited by Hamilton Bailey, F.R.C.S.; Volume II, Second Edition: 1942. Edinburgh: E. and S. Livingstone. Crown 4to, pp. 530, with 544 illustrations. Price: 40s. net.

BIOLOGICAL CHEMISTRY FOR MEDICAL STUDENTS.

The principal change in the third edition of Thorpe's "Biochemistry for Medical Students" is the inclusion of a chapter on the biochemistry of respiration.[1] This addition is to be welcomed, as there is a tendency in the smaller text-books of biological chemistry to neglect, or even to ignore, this important part of the subject.

Owing to restrictions on publications, other changes introduced are minor and do not affect the size of the book. It has, for example, not been possible to introduce a fuller treatment of the use of isotopes in following the metabolism of important compounds. It is to be hoped that the opportunity to give this important advance in biochemical technique, which has so greatly increased our insight into metabolic processes, will soon occur.

The omission of the coloured plate of absorption spectra of blood pigments is to be regretted, but is due, no doubt, to wartime restrictions.

In the chapter on basal metabolism the diagram which purports to represent the variation of basal metabolism with age is very misleading. Three important features of this variation are ignored: (*a*) the rapid rise from the low figures of early infancy to the maximal figures of early childhood; (*b*) the prepubertal interruption of the fall from maximal to adult values; and (*c*) the subdivision of the adult period of the female into the period of constancy, the rapid fall at menopause, and the slow decline towards senility.

This little book, which was first published in 1938, will be found to be one of the most useful and compact text-books for the medical student.

[1] "Biochemistry for Medical Students", by William Veale Thorpe, M.A., Ph.D.; Third Edition; 1943. London: J. and A. Churchill Limited. 8¼" × 5¼", pp. 484, with 39 illustrations. Price: 16s.

The Medical Journal of Australia

SATURDAY, OCTOBER 30, 1943.

All articles submitted for publication in this journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

References to articles and books should be carefully checked. In a reference the following information should be given without abbreviation: Initials of author, surname of author, full title of article, name of journal, volume, full date (month, day and year), number of the first page of the article. If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full date in each instance.

Authors who are not accustomed to preparing drawings or photographic prints for reproduction are invited to seek the advice of the Editor.

ANTENATAL SUPERVISION.

In his Listerian Oration delivered at Adelaide in 1927, Professor R. Marshall Allan, discussing the future of obstetrics, used the following words:[1] "We cannot stand still and simply enjoy the glorious tradition handed down to us. Rather must we become imbued with an active faith which will insist on overcoming the present obstacles while ever seeking new paths of advancement." Sentiments such as these could, of course, be applied to any of the commonly recognized specialties in medicine, as indeed to any sphere of human endeavour that is concerned with the progress and enlightenment of man. They seem peculiarly appropriate to obstetrics whose practitioners have to contend with so many factors that tend to increase the mortality and morbidity of mothers and their offspring. The obstetric art is as old as man himself, but a new era in its practice may be said to have dawned in 1900 when J. W. Ballantyne, of Edinburgh, by his advocacy of antenatal care and supervision, had provision made for the hospital treatment of pregnant women suffering from various morbid conditions. How widely his views have spread and how generally they have been put into practice is common knowledge. Every medical practitioner who engages in the practice of midwifery arranges to examine his patients in an early stage of their pregnancy and to see them at suitable intervals until delivery takes place. His care and his diligence are the measure of his understanding and of his devotion to the welfare of those who put themselves into his hands. Since supervision of women during the course of pregnancy depends for its success on the zeal of the medical attendant as well as on the readiness of the women to be supervised, it is advisable that the whole subject be reviewed from time to time lest a smart routine become dull and a dull routine degenerate into a matter of haphazard and slipshod methods. The present time is suitable for such a review and for several reasons. In the first place, if hospital reports and statements by doctors, nurses and others are to be believed, many more babies than usual are being born; secondly, hospitals are fuller than ever and they are also understaffed; and thirdly, civilian medical practitioners are so overworked not only in their general practices but also in other activities connected with the national emergency, that what does not at the moment seem necessary may be forgotten and signs and symptoms which do not at once obtrude themselves may be overlooked. As a matter of fact statements have recently been made by one undoubted authority in obstetrics which imply that practitioners in one large centre may be ignorant of the significance of certain important symptoms. Inquiries in other quarters do not support the implication, but as the implication exists it must be added to the reasons for the present discussion.

In the circumstances it may be well to recall the advantages that are claimed for supervision of the pregnant woman. They were clearly stated by E. Sydney Morris in the prize essay written in 1925 for the Melbourne Permanent Committee in Post-Graduate Work.[2]

1. The removal of anxiety and dread from the minds of expectant mothers and instruction regarding the best preparations, in view of all the circumstances, for the birth of her child.
2. The removal of much discomfort, amounting in many cases to actual suffering, from expectant mothers.
3. Opportunity for the early and effective treatment or control of such conditions as toxæmias, venereal disease, miscarriage, heart disease *et cetera*.
4. It will lead to an increase in the number of normal labours. By securing the removal to hospital before labour of those cases which do not offer a reasonable prospect of satisfactory confinement at home, delivery by forceps or other operative means can be reduced or at least undertaken under suitable conditions. If "forewarned" be equivalent to "forearmed", arrangements can be made in ample time for medical aid for those cases whose indications are that they will probably need it.
5. It will definitely lessen the stillbirth rate.
6. A fall in the maternal mortality rate and a decreasing amount of morbidity from such causes as sepsis, hæmorrhage, embolism, pelvic abnormalities and the like may reasonably be anticipated.

We do not intend to discuss these advantages *seriatim*, but rather to direct attention to the early recognition and treatment of the toxæmias of pregnancy. It was in regard to this question and its paramount importance that it was suggested that general practitioners might not be fully informed. That this subject is one that requires special attention was shown in an analysis of 1,042 cases in which antenatal supervision had been carried out. The analysis was made by R. Marshall Allan and presented by him to a meeting of the Queensland Branch of the British Medical Association in 1925.[3] One of the conclusions drawn by him was that patients suffering from albuminuria would have to be watched more carefully and that regular attendance would have to be insisted upon. It cannot be too strongly emphasized that the appearance of albuminuria in a pregnant woman is a danger signal that calls for prompt action. The patient should be put to bed, preferably in hospital, and should be treated by the recognized methods. In this regard readers are referred to the important study of toxæmia of pregnancy by Vera I. Krieger and R. McK. Rome published in this journal in 1941.[4] As a result of the work of these two observers, carried out at the Women's Hospital, Melbourne, it has became the practice at that hospital to curtail the time in which a patient is allowed to continue pregnancy with albuminuria which fails to respond to treatment. Pregnancy is now usually terminated when albuminuria fails

[1] The Medical Journal of Australia, June 25, 1927, page 913.

[2] The Medical Journal of Australia, September 12, 1925, page 301.

[3] The Medical Journal of Australia, March 13, 1926, page 287.

[4] The Medical Journal of Australia, May 17, 1941, page 597.

to respond to treatment within five days. It is quite justifiable to wonder whether the general run of practitioners realize the urgency of a condition which can make the inception of such serious measures imperative within so short a time. The information could never be obtained, but it would be interesting and no doubt instructive if it was possible to discover for how long a pregnant woman suffers from albuminuria before she is put to bed and looked upon as demanding continuous and detailed observation and treatment, that is, provided she is under regular observation and the albuminuria is discovered by the medical attendant as soon as it makes its appearance. The information would not only show how alert the medical practitioners were, for example, in the several States, but it would possibly give some indication of the type of teaching provided at obstetric hospitals. Of course, there are difficulties. To begin with, patients cannot always be persuaded that they must attend regularly at an out-patient clinic or at a doctor's consulting room during a pregnancy which appears to be causing them no inconvenience or at the most slight discomfort. To try to make a patient go to bed at home for proper supervision and study is difficult and seldom satisfactory. To send a patient to hospital as soon as albuminuria is discovered is not always easy. To begin with there may be children in the home who cannot be left, and again hospital beds which are never very numerous, are in greater demand than ever at the present time. It is interesting to note that an attempt has been made in Brisbane to deal with the first of these difficulties by the establishment of hostels for the reception of children whose mothers are admitted to hospital. To cope with the second difficulty prematernity beds should be provided, and, as E. Sydney Morris stated in his prize essay, these beds should be kept entirely apart from ordinary obstetric beds and should be maintained entirely for their specific purpose. Certain public hospitals have beds of this kind, and in all probability this is another advantage that public hospital patients have over those who can afford to pay for beds in private hospitals. Private hospital beds are in more demand nowadays in many centres than public beds and it is unfortunately true that nurses are not always helpful. A nurse may not always understand why a patient with albuminuria who looks well enough, should occupy a bed when others nearer term are clamouring for it. Such a nurse will and does engage in what according to the present-day mode we may call subversive activity. If the attendant practitioner does not watch his step and reply with a little appeasement, he will find that his patient demands to go home or perhaps that another practitioner is sent for to take his place at the bedside.

Without pursuing the subject further we may state several conclusions. Apart from the special points that have been mentioned, each practitioner must review for himself the general indications for and the advantages to be gained by the regular supervision of pregnant women. If failures such as those suggested exist, they are a reflection not on the system of antenatal supervision, but on the devotion or the skill or even the knowledge of the individual practitioner. The patient must be persuaded that supervision is necessary, and this will be achieved the more readily if the regular supervision is undertaken by the practitioner who is to conduct the confinement. This means that in an obstetric hospital the senior obstetrician should be called to see in the antenatal department any patients who are likely to come under his immediate care in the *dénouement* in the labour ward or operating theatre. In these days when so many women are engaged in industry an evening clinic should be held at a central hospital, as is done in Brisbane, so that there will be no valid excuse on the score of lack of facility. For the private practitioner who is hard put to it to find time for all his activities, it has been suggested that he should set aside a special session, say a couple of hours a week, when his obstetric patients could attend his consulting room by appointment. He would find this easier and more expeditious than he would if such patients attended at the same time as others suffering from diverse ailments. Practitioners who adopt this method speak well of it. In any case the great thing to remember is that by seeing their future *accoucheur* regularly patients acquire in him a confidence that will help them and him in their impending adventure.

Current Comment.

THE FIRE DISASTER AT BOSTON: A SYMPOSIUM.

In The Medical Journal of Australia for March 20, 1943, an account was given of the Cocoanut Grove disaster which occurred at Boston on November 28, 1942, when fire broke out at a night club and more than 490 persons of more than a thousand who were present lost their lives. The account was taken from a preliminary report by N. W. Faxon and E. D. Churchill, published in *The Journal of the American Medical Association* of December 26, 1942. Faxon and Churchill showed that the Massachusetts General Hospital was well prepared to meet the demands of such a disaster because of precautions taken on account of the war emergency. They described the condition of the patients on their admission to hospital and the way in which the work was organized. They also mentioned briefly the treatment used. A symposium has been published on the management of the Cocoanut Grove burns and the whole of the issue of *Annals of Surgery* for June, 1943, has been devoted to it. The symposium is divided into three sections. The first comprises three articles dealing with the problems of administration and psychiatry peculiar to a civilian disaster; the second comprises four contributions dealing with the course and treatment of the injuries to the lungs; and the third, five articles in which surface burns are considered. The contributions centre round the histories of 39 living patients who arrived at the Massachusetts General Hospital. The Boston City Hospital received 131 living patients and various nearby hospitals 11. Seven of the 39 patients at the Massachusetts General Hospital died.

A clinical description of the pulmonary complications is given by J. C. Aub, Helen Pittman and A. M. Brues. They point out that only three of the 39 patients were wholly free from respiratory symptoms, and they had covered their mouths with wet clothes or some article of clothing. One person was afforded complete protection by a wet handkerchief held over the mouth. There was but little correlation between the severity of surface burns and the extent of pulmonary damage. As a rule patients during the first three hours breathed quietly and superficially and had a weak cough. Breath sounds at first were distant and scattered basal râles were often present. Several soon became dyspnœic and progressed to a critical condition within a few hours. About three hours after the fire dyspnœa suddenly appeared in others, and this was associated with cyanosis, restlessness and increased râles. These symptoms by analogy with the external burns were assumed to be due to œdema of the burned pulmonary areas. The use of an oxygen tent relieved the cyanosis, but had no effect on the dyspnœa. A more

critical period occurred about twenty-four hours after the fire and continued for the next thirty-six hours. Dyspnœa and cyanosis became aggravated and the râles spread. This was obviously due to œdema. Tracheotomy was necessary in five cases and three of the patients died. Autopsy showed that the lesions were too extensive to be relieved by these procedures. In our last reference to this disaster it was pointed out that no evidence was available regarding the presence of poisonous gases which might have been partly responsible for the pulmonary involvement. Apparently further investigation has yielded no information on this point, for it is stated that the presence of phosgene or nitrous fumes which might have been responsible for the delayed œdema must remain a matter for speculation. After the œdema subsided, there set in the final subacute stage characterized by diffuse bronchiolitis. This resulted in obstruction of the air passages, particularly at the bases and consequent localized lobular collapse; it also caused acute emphysema at the apices from the trapping of air. Sputum which at first consisted of tenacious mucus, later became lighter and more frothy. As might be expected, the vital capacity of the lungs in most of the survivors was reduced. Two points call for emphasis—the first, that the extreme œdema that sometimes occurred could not be predicted; the second, that the areas of collapse were often quite transitory and migratory.

Richard Schatzki publishes a report on the radiological appearances of the pulmonary lesions. As may be imagined, X-ray examinations were made under very difficult conditions. Thirty-five of the patients were, however, submitted to such an examination. Abnormal appearances were found in twenty-two instances. Most of them could be explained by areas of atelectasis and emphysema, both being apparently due to bronchial occlusion. Atypical lesions such as miliary nodules and areas of "drowned lung" were seen in a few instances. Infarcts could not be recognized in the first period following the fire. The lesions of all survivors but two finally disappeared.

The pathology of the lesions found is dealt with by T. B. Mallory and W. J. Brickley. They base their remarks on six post-mortem examinations. While they admit that the number of cases is small, they point out that the findings are similar to those obtained at sixteen other autopsies of which they have knowledge. Their descriptions may, therefore, be looked on as fairly representative. In three of the cases described by them death had occurred before the body reached hospital; in three cases the patients died forty hours, fifty-two hours and sixty-two hours after they were admitted to the wards. It is important to note that, from an inspection of all the bodies delivered to the hospital and to the mortuary, only a small proportion of the victims had suffered burns sufficiently extensive to account for death. The most obvious contributory factor was carbon monoxide poisoning—in all the protocols that are published prominence is given to the bright cherry-red colour of the tissues. The saturation of the hæmoglobin of blood from the right side of the heart in two cases in which death occurred before arrival of the bodies at the hospital, was respectively 42% and 50%. This degree of saturation was not regarded as being in itself necessarily lethal. It may be recalled that Haldane[1] found that when blood has absorbed carbon monoxide to the extent of 30% symptoms first make their appearance. With every increase up to 50% of saturation the symptoms become more and more imperative and on the slightest exertion the patient loses consciousness; death occurs when saturation has reached about 80%. In one instance Mallory and Brickley found traces of nitrogen dioxide in gas collected by suction from the respiratory tract; with a second sample negative results were obtained. "Beyond this point post-mortem studies were entirely in accord with early clinical impressions in emphasizing the great importance of the involvement of the respiratory tract." In the "dead on arrival cases" intense but non-necrotizing hæmorrhagic tracheitis and bronchitis were present and the lungs were heavy and voluminous. From the cut surfaces of the lungs fluid could be expressed in large amounts. Microscopic examination confirmed the presence of acute pulmonary œdema and demonstrated in the upper tracheobronchial tree a sero-hæmorrhagic exudate with no significant leucocytic infiltration. The conclusion was that the victims had inhaled an irritant agent, either physical or chemical, that they lived long enough to develop a serous but not a leucocytic reaction, and that therefore the survival period was to be measured in minutes rather than in seconds or in hours. The mechanism of death was held to be anoxæmia, dependent in part on the inhalation of carbon monoxide and probably other gases, and in part on œdema of the lungs. In the three cases in which death occurred after admission to hospital, diffuse hæmorrhagic and focal membranous reaction was present in the lower part of the trachea and in the primary bronchi. Diffuse membranous bronchitis was most severe in the secondary and tertiary subdivisions of the lobar bronchi, but extended in many areas to the smaller bronchioles. Sometimes the membrane was firmly adherent, sometimes it was readily separable. In contrast to the fairly uniform changes in the tracheo-bronchial tree, the pulmonary lesions varied considerably. Atelectasis and compensatory emphysema were present. Occasional areas of hæmorrhage were found and also some signs of bronchopneumonia. Leucocytic infiltration was comparatively light and pneumonic reaction was thought to be of brief duration. In discussing the lesions, Mallory and Brickley draw attention to indications that the flames were to a considerable extent limited to the upper portions of the rooms—the heads of the victims were disproportionately burned. From this it is to them understandable that inhalation of flame was frequent. It was not easy to determine how far flames penetrated the respiratory passages; but characteristic eschars were found within the nares, and the black membranous exudation of the larynx and the lesions of the trachea probably had the same origin. The rapid development of pulmonary œdema is not easy to explain; but since it has been shown that anoxæmia alone may rapidly bring it about, the suggestion is put forward that anoxæmia and some irritant vapour were jointly responsible. No mention is made of the possibility that terror, which must have been intense, had anything to do with the occurrence of the œdema. The idea is worthy of consideration. It would be unwise to deny out of hand the possible influence of a strong nervous stimulus of psychic origin acting in conjunction with other factors.

So far no mention has been made of the treatment adopted. In our reference to this disaster last March it was stated that a bland boric ointment and a protective dressing were applied to the burned surfaces. Oliver Cope discusses this treatment and points out that no preliminary *débridement* or dressing was applied and that antibacterial chemotherapy was given internally. The bland ointment dressing was applied regardless of the degree of the burn and pressure was applied by bandages, even to the scalp, face and extremities. Those who applied the dressings adopted aseptic precautions. Cope justifies this treatment by the contention that it does not interfere with the life-saving treatment of shock and at the same time tends to prevent bacterial contamination. There is certainly much to be said for it in the handling of a catastrophe in which the number of burned casualties is out of proportion to the number of trained personnel. The dressings were not changed until the fifth to the tenth day when boric ointment gauze was reapplied. For those areas which were the site of deep destruction of skin, wet dressings of boric acid or physiological saline solution were used after the first two weeks to expedite removal of the burned tissue and prepare the surfaces for grafting. Cope admits that the treatment is "unorthodox". Unfortunately it is not possible to reproduce his arguments in favour of it. It must suffice that the treatment was successful. He is not quite convinced that the application of pressure to face and scalp is wise. Further research on this and other aspects of the treatment of burns is undoubtedly needed.

[1] Quoted by J. Glaister and D. D. Logan in "Gas Poisoning in Mining and Other Industries", 1914, page 86.

Abstracts from Medical Literature.

PÆDIATRICS.

The Nutrient Enema.

J. W. A. MacKenzie (*Archives of Disease in Childhood*, March, 1943) reports investigations performed with three of the more important substances which are commonly used in nutrient enemata, namely, glucose, normal saline solution, and predigested protein, and draws the following conclusion. Glucose is absorbed from a simple solution in water, introduced into the lower segment of the bowel. The amounts of glucose absorbed vary considerably. Concentrations of 5%, 10% and 13·5% were well borne. Definite signs of irritation followed the use of 20% solutions. It is not possible to say from the investigation what is the optimum concentration. Normal saline solution, when given rectally, is easily retained and is non-irritant. Chloride is readily absorbed from a rectal infusion of normal saline solution. Non-protein nitrogen is absorbed quantitatively from an enema of predigested casein. It is apparently metabolized in a similar manner to nitrogenous food given by mouth.

Cause of Death in Newborn Babies.

S. Engel and G. H. Newns (*British Journal of Children's Diseases*, April-June, 1943) have presented and analysed the causes of death during the neonatal period in a series of 587 autopsies performed in the Hospital for Sick Children, Great Ormond Street. They point out that the decline of the population can be arrested as far as the rising generation is concerned in only one of two ways: either the number of births can be increased or the infant mortality reduced. The infant mortality has as a matter of fact been reduced enormously in the last fifty years, but it has not been accompanied by a corresponding fall in the neonatal mortality. From the 587 autopsies the authors have picked out 112 cases in which infants died within the first four week of life, and they have tabulated the causes of death as follows: birth injury, 4; malformations, 44; prematurity, 14; erythroblastosis, 6; hæmorrhagic disease, 18; septicæmia, 13; gastro-enteritis, 5; varia, 7. Birth injury does not appear very often in the series. Most of these babies succumb in maternity hospitals, and it is therefore not possible to say how many of the deaths could have been prevented. Malformations, chiefly affecting the heart and intestines, are not as a rule susceptible to treatment. Only a small minority of malformations of the intestine can be cured by surgical treatment. The number of cases of prematurity are much smaller than might be expected. The majority of premature babies do not reach hospital, however. Another possible reason is that premature babies stand a better chance of survival in hospital on account of more skilled nursing and better facilities for treatment. They should be nursed in properly equipped units which might be attached to the maternity hospital or might be in a general children's hospital. Nurses of these units should be trained children's nurses. In the case of erythroblastosis the new method of transfusion of "Rhesus negative" blood is extremely successful, but early diagnosis and admission to a suitable hospital are essential. The hæmorrhagic disease of the newly born—hypoprothrombinæmia in its various manifestations—may be prevented by the injection of vitamin *K* into the mother shortly before delivery, or cured by prompt administration of vitamin *K* to the infant. Here again early diagnosis and speedy action are necessary. Gastro-enteritis and septicæmia should, under modern conditions, never occur. Gastro-enteritis in the newly born would be of negligible occurrence if all newborn babies were breast-fed. It cannot be impressed too much on everyone dealing with the newborn baby how important breast feeding is in the neonatal period. It should be secured for at least six to eight weeks. Among "varia" are cases of syphilis, pneumonia and other rare conditions.

Absorption of Drugs from the Rectum.

J. W. A. MacKenzie (*Archives of Disease in Childhood*, March, 1943) states that although in modern times hypodermic, intramuscular and intravenous injections afford a sure means of supplementing the oral administration of medicine, the rectal route is still of value. In regard to drugs given rectally, clinical evidence of absorption is conclusive in a number of instances, but many drugs which are given *per rectum* produce no easily recognized effects and clinical evidence of their absorption is equivocal. There are few controlled studies on the rate and completeness of absorption of rectally administered drugs. In the present study absorption of bromide, salicylate, and sulphanilamide after rectal administration has been investigated. It has been stated frequently that bromide is absorbed when administered rectally, but it has proved impossible to find any records of experimental work substantiating this opinion. It is probable that simple bromide salts are well absorbed, for the more complex substance, tribromethyl-alcohol ("Avertin"), is absorbed and now holds an established place in the range of anæsthetics. Previous researches have shown that in the human subject two other halogen salts are well absorbed by the rectum. In an earlier paper the observation that chloride was well absorbed was confirmed, and Gompertz, Osborne and Cohn have shown that iodide is absorbed readily when given in solution. The conclusion drawn from the author's present investigation is that protamin bromide is absorbed as readily from the rectum as it is when given by the mouth. In regard to sodium salicylate, Heyer gave the drug *per rectum* in an attempt to minimize the undesirable effects which frequently follow the administration of large doses of sodium salicylate by the oral route. He showed that the instillation of 120 to 240 grains of sodium salicylate in six ounces of starch water was followed by the relief of the joint pain and a fall in temperature. Since these therapeutic effects were achieved by rectal administration of salicylate, Heyer considered the rectal route preferable to the oral route, as thereby gastric disturbances were avoided. Recently Valesquez obtained satisfactory results with an isotonic solution of sodium salicylate. He has reaffirmed that, since gastric disturbances are thereby avoided, the rectal route is preferable to the oral route. MacKenzie's investigations have shown that sodium salicylate is readily absorbed from a rectal infusion. The quantities of salicylate which are excreted after single doses of sodium salicylate given either by mouth or by rectal infusion, are variable. Much of the absorbed salicylate is apparently destroyed in the tissues. Excretion is rapid after both oral and rectal administration, but it is more rapid when given by mouth than by the rectum. As a therapeutic measure, salicylate enemata can if necessary replace oral administration of the drug. In the administration of sulphanilamide by mouth nausea and vomiting are frequent accompaniments and the employment of alternative methods may be necessary. Under such conditions rectal administration as a practical alternative to the painful and sometimes irritating intramuscular injection suggests itself. The author concludes that sulphanilamide, given in solution by mouth, is absorbed with great rapidity. Apparently it is excreted more rapidly by children than by adults. Sulphanilamide is readily absorbed from the rectum when given in solution, but more slowly and less completely than when given by mouth. The drug is poorly absorbed from suppositories. The administration of sulphanilamide in solution *per rectum* may be of considerable value, especially when there is intolerance to the drug given by the mouth. Large doses should be given when the rectal route is employed.

ORTHOPÆDIC SURGERY.

Derangement of the Semilunar Cartilage.

W. R. MacAusland (*Surgery, Gynecology and Obstetrics*, August, 1943) presents a study of 850 cases of derangement of the semilunar cartilages, extending over a period of more than thirty years. The injury occurs most commonly among patients aged between eighteen and forty years, and it is generally agreed that operative excision of the damaged cartilage is a highly satisfactory form of treatment. The knee is usually stable and painless and has complete function, and the patient is able to return to office work within a few weeks and to strenuous occupations within two or three months. Unsatisfactory operative results, as well as protracted convalescence, may be due to arthritic changes, to persistent traumatic synovitis and relaxed ligaments, to some associated pathological condition or to weakness of the *quadriceps extensor* muscle, or even to a combination of several of these factors. When arthritic changes are present, arthrotomy may give relief from the symptoms directly traceable to the cartilage derangement, and some functional improvement may be achieved, as well as the prevention of further arthritic changes; but the affected knee needs to be always protected. Repeated trauma with effusion may lead to chronic synovitis and weakening of the ligamentous structure of the knee joint. Such complications may be prevented by early operation and by improvement of the tonicity of the quadriceps

muscle by means of regular contraction exercises. Injuries of the cartilage are often associated with damage to other joint structures, such, for example, as the crucial ligaments, so that laxity of the joint persists after removal of the cartilage. The best treatment is to secure improvement in the muscular structure. The tone of the *quadriceps extensor* muscle, which is of extreme importance to the stability and structure of the knee, should be carefully safeguarded throughout the patient's treatment. It should be explained to the patient that he must cooperate fully in the attempt to recover this muscle power. The author gives a detailed account of the treatment he uses for derangements of the semilunar cartilages.

Sciatic Pain and the Sacro-Iliac Joint.

C. D. HERSHEY (*The Journal of the American Medical Association*, August 7, 1943) has investigated the role of the sacro-iliac joint in relation to the components of the sacral plexus. The study was prompted by the author's discovery of the high incidence in anatomical specimens of hypertrophic arthritic changes with spur formation in the region of the anterior surface of the sacro-iliac joint, particularly in the area traversed by the lumbo-sacral trunk. In the 64 cadavera on which dissections were made, the lumbo-sacral trunk was found to be in direct contact with the sacro-iliac joint at the point where it traverses the joint in its lower one-third. The upper part of the origin of the pyriformis muscle was found to lie medial to the lumbo-sacral trunk and never to lie between the trunk and the joint. Hypertrophic arthritis in the form of severe spur formation on the anterior line of the sacro-iliac joint was found in one-quarter of the bodies studied; in most instances the condition was considered to be capable of producing direct irritation of the lumbo-sacral trunk. The author points out that hypertrophic sacro-iliac arthritis is more frequently found in the later age groups, but is often found in younger persons. Hypertrophic lipping in the lower one-third of the joint, where the lumbo-sacral trunk crosses it, can be readily revealed by antero-posterior X-ray films of the pelvis.

Milkman's Syndrome.

L. EDEIKEN AND N. G. SCHNEEBERG (*The Journal of the American Medical Association*, July 24, 1943) report a case of multiple spontaneous idiopathic symmetrical fractures (Milkman's syndrome), the twentieth on record. They state that the pathological condition of the skeleton in this condition produces pain, disturbances of gait, and the radiological appearance of spontaneous multiple symmetrical transparent bands or pseudo-fractures, associated with little or no callus formation, which progress and eventually confine the patient to bed. The lesion mainly affects middle-aged women, and the results of laboratory investigation are not distinctive. The etiology and pathogenesis are unknown; the disease may be a variant or an atypical form of osteomalacia. Autopsy was performed in one of the cases recorded, and the sole distinctive pathological change found was increased vascularity about the osseous lesions. In several cases cure has been reported to follow treatment with calcium, vitamin *D*, arsenicals and vitamin *A*. In the authors' case, the patient was treated with vitamin *D* and calcium lactate, and after twenty-five weeks she was free of pain and able to walk, although still with the characteristic "duck waddle", and she could earn her living. Radiological examination of the skeleton revealed that all the pseudo-fractures were soundly healed and that no new lesions had occurred.

Early Mobilization in Fractures of the Upper End of the Humerus.

FRANK BROSTROM (*Archives of Surgery*, May, 1943) believes that the plan of treatment for fractures of the upper end of the humerus evolved by Lindsay and Brown and by Wilson and Schmidt produces results far superior to those obtained with the old method of long immobilization. He has used the method in 97 cases; the results were poor in six cases, fair in 17, good in 32, excellent in 27 and undetermined in 15. The fracture was in the surgical neck of the humerus in 61 cases, in the greater tuberosity in 17, in the anatomical neck in 11, in the lesser tuberosity in two, and in the shaft in six; in about half the cases the bone was comminuted. The method of treatment used is as follows. The limb is supported by an axillary pad, and the arm is fixed to the side of the body by a wide bandage, the elbow being left free. The wrist is supported by a cuff suspended from the neck. In bed, the patient is supported with the body at an angle of approximately 35°; he must not be allowed to assume the horizontal position. On the day after the fracture has been sustained, mild, dry heat is applied to the shoulder, elbow and hand, without disturbance of the bandage. On the fourth day after the application of heat the bandage is removed with the patient in a standing position. Light effleurage is carried out over the entire extremity and shoulder to relieve pain and reduce swelling, and at the same time the forearm is gradually extended. The patient is then instructed to flex the trunk, bend the knee on the affected side and permit the damaged arm to fall forward completely relaxed, so that passive abduction and forward flexion are secured. The patient then moves his body in a circular motion, so that passive circumduction of the shoulder occurs. The range of motion is gradually increased, and after five to seven days active motion replaces passive motion. Strict supervision of the treatment is essential. At the end of the treatment the axillary pad and body bandage are replaced. Three or four weeks later they are discarded, and the forearm cuff is discarded a week to ten days later. At the end of four weeks active motion of the shoulder is encouraged. Treatment is continued at progressively longer intervals until a satisfactory range of motion is obtained.

Traction Injuries to Nerves.

W. B. HIGHET AND W. HOLMES (*The British Journal of Surgery*, January, 1943) have studied traction injuries to nerves. They began with the lateral popliteal nerve, basing their conclusions on the study of eight cases of their own, in three of which recovery failed to occur after extensive resection followed by nerve suture. They believe that the failure was due to a second traction injury inflicted on the nerve in the course of the post-operative straightening of the knee; they also believe that this injury was related to the extent of the original resection. The authors state that the traction lesion is characterized by much more extensive damage to the nerve trunk than follows injury by incision, laceration or gunshot wound. The pathological changes in the nerve (fibre degeneration, intraneural fibrosis and vascular abnormality) extend far above the site of obvious damage. The connective sheaths of the nerve are ruptured to varying degrees; the nerve may be completely divided, or it may bear a fusiform neuroma, or it may show continuity on macroscopic examination. Spontaneous recovery failed to take place in their cases even when nervous tissue was continuous throughout the lesion; regenerating nerve fibres crossed the lesion, but they remained of small diameter, and most of them failed to become myelinated. In three of the eight cases end-to-end suture was performed after extensive resection of the lesion; closure of the gap was obtained by extensive mobilization of the nerve and flexion of the knee. No recovery took place in these cases; but in one case in which less extensive resection was necessary the patient is making a good recovery. The nerves which failed to recover after suture were again explored; histological examination revealed changes similar to those following the original lesion, but more severe and extensive. The authors then reviewed 42 other cases of peripheral nerve suture performed at the same hospital, with a view to determining the maximum extent of resection compatible with recovery in other nerves and after other types of lesion. From this review and from their study of the literature, the authors conclude that it is probable that the maximum resection compatible with recovery depends, not only on the nerve, but also on the site of suture. If the suture line overlies an acutely flexed joint, the degree of damage during post-operative stretching may be more severe. They emphasize the necessity for the recording, at every operation on a peripheral nerve lesion, of details such as the extent of resection and the site of suture, so that operative procedure may be properly correlated with functional recovery. The authors admit that their series of cases of lateral popliteal nerve injury is too small to allow them to determine the best procedure; but they make the following recommendations: (i) Early exploration appears to be indicated in all cases. (ii) If the nerve lesion amounts to complete division, resection and suture should be attempted. (iii) If the continuity of the nerve seems to have been preserved, and if the nerve seems reasonably normal, nothing further should be done; but if the nerve is abnormal in appearance and on palpation, in spite of the apparent continuity, trial sections should be made at the centre of the lesion, and if extensive scarring is found, resection and suture should be performed. (iv) When at either early or late exploration the resection necessary is extensive (ten centimetres or more of the nerve), suture is unjustifiable, and measures such as nerve grafting should be considered.

British Medical Association News.

MEDICO-POLITICAL.

ANNUAL MEETING OF THE DELEGATES OF THE AFFILIATED LOCAL ASSOCIATIONS OF MEMBERS WITH THE COUNCIL OF THE NEW SOUTH WALES BRANCH OF THE BRITISH MEDICAL ASSOCIATION.

THE annual meeting of delegates of the local associations affiliated with the New South Wales Branch of the British Medical Association was held at the William H. Crago Council Room, British Medical Association House, 135, Macquarie Street, Sydney, on October 1, 1943, DR. K. S. M. BROWN, the President, in the chair.

The following delegates of local associations were present: Dr. R. A. Robertson (Border Medical Association), Dr. A. E. Panting (Broken Hill Medical Association), Dr. H. A. McCredie (Canterbury-Bankstown Medical Association), Dr. O. J. Ellis (Central Northern Medical Association), Dr. R. G. Woods (Central Southern Association), Dr. G. N. M. Aitkens (Central Western Medical Association), Dr. N. E. McLaren (Eastern District Medical Association), Dr. J. P. Hardie (Eastern Suburbs Medical Association), Dr. G. L. Howe (Kuring-gai District Medical Association), Dr. G. F. Elliott (Illawarra Suburbs Medical Association), Dr. A. L. Castleberg (South-Eastern Medical Association), Dr. R. J. Jackson (North-Eastern Medical Association), Dr. C. R. Sim (Southern District Medical Association), Dr. C. H. Jaede (South Sydney Medical Association), Dr. A. A. Lang (Warringah Medical Association), Dr. R. D. Mulvey, M.C. (Western Medical Association).

Dr. G. L. Howe (Kuring-gai District Medical Association) was accepted as a substitute for Dr. E. A. Cook.

The following members of the Council of the New South Wales Branch were present: Dr. G. M. Barron, Dr. G. Bell, Sir Charles Blackburn, Dr. A. J. Collins, Dr. A. M. Davidson, Dr. L. A. Dey, Dr. Marie Hamilton, Dr. P. L. Hipsley, Dr. R. Jeremy, Dr. W. F. Simmons, Dr. A. C. Thomas, Dr. E. A. Tivey, Dr. G. C. Willcocks.

Dr. J. G. Hunter (Medical Secretary) and Dr. H. Hunter (Assistant Medical Secretary) were present.

Apologies.

Apologies for non-attendance were received from Colonel W. Vickers, Dr. T. M. Greenaway and Dr. B. T. Edye.

Welcome of Delegates.

Dr. K. S. M. Brown, the President, welcomed the delegates. He said that the Branch Council welcomed the opportunity of meeting the delegates and of discussing with them the problems they faced in the various areas and of gaining an understanding of their difficulties.

Minutes.

On the motion of Dr. O. J. Ellis, seconded by Dr. N. E. McLaren, the minutes of the previous annual meeting of delegates, held on December 4, 1942, which had been circulated amongst members, were taken as read and signed as correct.

Hospitals Commission of New South Wales.

It was moved by Dr. C. R. Sim, seconded by Dr. R. G. Woods:

> That the New South Wales Government be requested to allow the New South Wales Branch of the British Medical Association to nominate adequate representation of medical practitioners on the Hospitals Commission, apart from government nominees.

Dr. C. R. Sim said that at a meeting of his local association held some two weeks previously, it was pointed out that the Hospitals Commission had a great deal of power with regard to the running of the various hospitals in the State. It was thought that it would be a good idea if the medical profession had adequate representation on the commission. Even if there were some medical men on the commission, the members of Dr. Sim's association held that they were representatives of the Government and not of the medical profession.

Dr. J. G. Hunter said that actually the Chairman of the Hospitals Commission was a member of the medical profession. The Government proposed shortly to introduce a bill to amend the constitution of the commission, so that it would be a whole-time body. At present it was not a full-time body and the personnel were engaged in their own professions.

After further discussion the motion was put to the meeting and carried.

Recovery of Fees for Treatment of Injured Railway Employees.

Dr. C. R. Sim moved the following motion, which was seconded by Dr. R. G. Woods and carried:

> That the Council of the New South Wales Branch confer, if necessary, with the Railway Commissioners and with the Commissioner of Road Transport with a view to arriving at a more equitable method of recovering fees for the treatment of injured railway and transport employees.

The Medical Secretary reported that the Government *Railways Act* and the *Transport Act* had been amended to provide for payment, on the basis of the *Workers' Compensation Act*, of medical, hospital and ambulance expenses incurred by employees injured in the course of their duties.

War Emergency.

Commencement of Practice.

Dr. J. P. Hardie moved the following motion:

> That, for the duration of the war, under no circumstances shall a member of the British Medical Association be allowed to commence a new practice in an area where any scheme for the protection of practices is in force without the consent of the Local Association Committee.

Dr. Hardie said that this had been the policy of the Eastern Suburbs Medical Association for about four years, from the time when a large number of men went into the services and an efficient and successful protection of practices scheme was inaugurated. It was held by his association that the policy should become the general one, and should have the backing of the Branch Council and of the members as a whole. The policy was intended as a means of coordinating the medical work of the district, and not as an attempt to coerce intending practitioners. As a matter of fact, a number of new medical practitioners had been absorbed into the district with the help of the committee of the local association.

Dr. R. D. Mulvey seconded the motion.

Dr. G. L. Howe wondered whether the motion was unnecessary. He thought that while the State Medical Coordination Committee was in operation and Dr. George Bell was in complete control of the situation, there was no possibility of anybody's "sitting down" anywhere, and that state of affairs would persist for some considerable time.

Dr. George Bell said that as a matter of policy he thought that people intending to begin practice should approach the members of the local association before they did so; they should not be at loggerheads with their fellow practitioners. For that reason, while he did not think that the local associations could prevent people from beginning practice in their areas, it was a good thing for them to consider every case, and the State Medical Coordination Committee would be glad of their opinions.

The President raised the question as to whether the Branch Council was in a position to allow or disallow people to start in practice. Every month a notice appeared in the circular that was sent out to members, asking them before starting in practice to get into touch with the Branch Council. When a case arose, the Branch Council consulted the committee of the local association concerned.

Dr. H. A. McCredie thought that the motion should be allowed to stand over.

Dr. O. J. Ellis pointed out that the Branch Council had no legal power to prevent anyone from starting in practice anywhere; it could only try to dissuade him from doing so.

Dr. R. J. Jackson thought that the motion should be allowed to stand, even if only for the value of its moral suasion, which was quite real in country districts, even if it had not much effect in the suburbs.

After further discussion, the President suggested that the word "encouraged" might be better than "allowed". He pointed out that legally the Branch Council could do nothing in the matter; any disciplinary action would amount to restriction of trade.

Dr. J. G. Hunter, in order to clarify the position, said that there were quite a number of areas in which there were no protection of practices schemes. The Central Medical Coordination Committee was not concerned with individuals or their rights, but with the provision of medical care to the community. The difficulty about such measures as the one proposed was their enforcement. The Council had no power to compel a member not to practise in any area. But actually, men wishing to begin practice in an area of which the Council disapproved were usually quite willing not to do so. Possibly the resolution was not well worded. There was a standing direction to all members not to commence practice without consulting the Council. A situation might arise which might make it necessary for the Council in its wisdom to decide that the needs of the community demanded that somebody go to some particular place to begin practice, and the local association might not take the same view.

Dr. N. E. McLaren pointed out that the motion referred only to those areas in which protection of practices schemes were in vogue.

Dr. A. J. Collins, by way of explanation, said that the British Medical Association was directly represented on the State Medical Coordination Committee, which was formed to study the medical needs of the community. The representative, while carrying out his duties, at the same time bore in mind British Medical Association principles. As Dr. Hunter had pointed out, the needs of the community might demand that some person should begin practice in a particular district against the wishes of the local association. Dr. Collins thought that the resolution could with advantage be redrafted, so that it would be a little less drastic, but its meaning would be perfectly clear.

Dr. J. P. Hardie said that he was sure that the members of his association had no thought that any force greater than moral suasion would be brought to bear. He suggested the replacement of the words "allowed to commence a new practice" by "discouraged from commencing new practices".

Dr. G. M. Barron suggested the deletion of the words referring to protection of practices schemes, so that the motion would cover the whole of New South Wales.

After further discussion, Dr. J. G. Hunter suggested that the motion should be worded as follows: "For the duration of the war in no circumstances should a member of the British Medical Association commence a new practice in any area without the consent of the local association concerned."

Dr. J. P. Hardie said that the portion dealing with the protection of practices was the one that had inspired the motion. However, he raised no objection to the wording suggested by Dr. Hunter which he and the seconder accepted. The motion as amended was then put to the meeting and carried.

Return to Practice after Absence on Military Service.

Dr. R. J. Jackson moved, and Dr. G. N. M. Aitkens seconded, the following motion:

> That a direction to members from the Council be given that for the guidance of patients a printed notice be displayed in waiting rooms as follows: "Dr. . . . . has now returned to his practice after absence on military service. It is the expressed wish of his colleagues that his former patients place themselves under his care."

Dr. Jackson said that the motion was merely an expression of the intention of members of the Northern District Medical Association to see that men who had been away from their practices should, on their return, be given their rightful positions as far as lay in the power of the men managing their practices. He thought that the effect of such a notice would be enhanced if it appeared over the signature of some responsible member of the Branch Council, perhaps the President. If the meeting approved of the motion, perhaps it might be sent to the Federal Council of the British Medical Association in Australia, with the object of having it made a nation-wide resolution.

Dr. O. J. Ellis said that he presumed that the notices were not to be put up until one or two men had returned to their practices. Dr. R. J. Jackson said that men were already returning, and the intention was to forestall any trouble. Dr. R. A. Robertson said that similar notices had been in use by his association for some time, but that they made no difference at all to patients. Dr. G. C. Willcocks asked who was to take the first step in the matter—whether the local association would notify the Branch Council when a man returned to his practice. Dr. G. J. Rawle said that the official *imprimatur* of the Council was the all-important thing. There would be difficulties, as members knew. But, unlike Dr. Robertson, of Albury, the members of the North-Eastern Medical Association had put up similar notices and found the effects good. The better class of patients would observe the principle involved; the others would consult their own interests, but that was no reason why they should not be given a lead. Dr. P. L. Hipsley said that it appeared that no account was to be taken of the hundreds of young men who had been away at the war for many years and who would be starting in practice after the war. If such notices were to be printed, then these young men should be put on the "old" list.

Dr. G. F. Elliott said that similar notices had been in use in the Illawarra district for some time. He could not see that it would be altogether wise to make the direction come from the central authority; the local associations could have the matter attended to quickly. The fact that the notices bore any particular signature would not be of much assistance.

Dr. A. L. Caselberg said that the subject of the motion appeared to have altered during the discussion. What those present were really being asked to vote on was a matter of principle. The principle, as put forward by the mover of the motion, was that if the thing was worthy of being done, it should have the hallmark of the Council's approval. Dr. Caselberg agreed with the mover of the motion that it would be an advantage to have the matter dealt with by the Council or not dealt with at all.

Dr. G. L. Howe could not see how Dr. Hipsley's suggestion could be incorporated in the scheme. In Dr. Howe's area a notice such as the one proposed would be necessary.

Dr. Jackson, in reply to Dr. Hipsley, said that he thought that there was no doubt that the young men beginning practice would receive the sympathetic consideration of the established practitioners. What Dr. Hipsley had said appeared to follow more logically on the previous motion. Dr. Elliott's contention that the matter would be better left in the hands of the local associations was true up to a point—the machinery would act more quickly; but Dr. Jackson did not think that the notices would then have the same status, particularly if the notices were ultimately to have a nation-wide distribution. Moreover, local associations differed in the efficiency of their organization.

The motion, on being put to the meeting, was carried.

The Powers of the State Medical Coordination Committee.

Dr. O. J. Ellis moved the following motion:

> That this meeting of delegates is of the opinion that the powers of the State Medical Coordination Committee in regard to the provision of medical services for the civilian population are insufficient and that the Central Council should make the strongest possible representations to the responsible authorities to have these powers increased.

Dr. A. L. Caselberg seconded the motion *pro forma*.

Dr. Ellis said that he was in some doubt as to what the powers of the State Medical Coordination Committee really were. Many members of his association felt that the present situation was extremely difficult for civilian medical practitioners. The men in some areas might feel that they were being worked harder than those in others. During the last few months his members had been in touch with Dr. George Bell, and he endeavoured to solve their difficulties and help them as far as possible. But the amount of help that the State Medical Coordination Committee could give seemed to be very limited. The committee had great difficulty in keeping the correct balance. Men were trying to do more than they could do, and they could not do their work properly; yet not far away, and sometimes in the same areas, they saw service medical men who had not much to do. There were many camps that had more medical men than were actually required. Dr. Ellis considered that there should be better coordination in the dividing up of the work, at least in the back areas, so that some of the hard-pressed civilian medical practitioners should receive a little more help.

Dr. George Bell discussed the constitution and functions of the State Medical Coordination Committees. He said that the committees were composed of an officer appointed by the Director-General of Medical Services, a representative of the navy and one of the air force, a representative of the British Medical Association appointed by the Minister on the recommendation of the British Medical Association (Dr. A. J. Collins in New South Wales). The Minister

could appoint a deputy chairman (Dr. Bell in New South Wales). Dr. Bell was also chief executive officer. There were also two other representatives, one from the Hospitals Commission and one from the Department of Health. Recently a member had been appointed to represent the lay public; he was appointed by the Minister for Defence. In New South Wales this member was Mr. Gollan. Those were the executive members of the committee; in addition there were certain appointed members who had an advisory function—they could speak but not vote. Those members were very important to the committee; they were in New South Wales Sir Charles Blackburn, Dr. J. G. Hunter, Dr. J. W. S. Laidley and Dr. W. F. Simmons, who was assistant executive officer. The State Medical Coordination Committee had to comply with certain directions. Its main function was to keep the balance between the services in the State and to provide for the needs of the civilian population. There seemed to be some doubt as to whether the Emergency Medical Service could function unless the enemy actually landed in the country. The original idea had been that the service should function if that happened. The main object was to make provision for the civilians who would have to be evacuated. The committee could enrol members and it could post them to various duties, but if it gave directions to members, someone had to pay them. In New South Wales seven medical practitioners had been sent to various areas, and they were serving a useful purpose. When the problem arose of providing relief for men who were ill or of placing extra medical men in certain areas, the committee had really done the work more or less by mutual agreement; it got into touch with the local people, found out what were the needs of the area and persuaded men to go there. So far no drastic steps had had to be taken; it was wise to be very careful about taking drastic steps, unless they were absolutely necessary. Dr. Bell said that the committee could do better work in that way than it could if it had too many powers; the powers were there if an extreme emergency should arise.

Dr. A. A. Lang said that Dr. Bell's explanation had made the position much clearer. On reading through the motion, he had come to the conclusion that the wording was rather vague. Was it possible to have the powers of the committee increased? Who was going to increase them? The demands of the army had priority, and the local medical coordination committee was subservient to the Central Medical Coordination Committee. Dr. Lang did not think that the motion was workable, and he wondered what Dr. Bell thought.

Dr. George Bell read aloud the statement of the powers and functions of the Central Medical Coordination Committee and of the State Medical Coordination Committees.

Dr. A. M. Davidson said that Dr. Bell had put his finger on the vital spot when he said that there were military establishments, and that nobody was going to let the coordination committees run the war. Any increase in their powers would encroach on the military authority. Considerable overlapping seemed to occur; the army and the air force had medical men in the one area, both together. The military board should be made to overhaul its establishments, and no further powers should be sought for the coordination committees, because such action might have undesirable effects in other directions.

Dr. R. A. Robertson said that he had had experience of doing military duty for definite periods. He thought that from the military point of view change would be difficult.

Dr. G. N. M. Aitkens said that, as one who had seen twelve months' service in the army in the present war, he wished to make it plain that the present establishment of the army as far as field units were concerned could not be reduced without interference with the efficiency of the services. The civilian medical men had to realize that army medical officers had months of training to undergo. During training perhaps their hands would not be fully occupied; but they would be fully occupied during action. The months of training were certainly necessary. The regimental medical officer must be with his unit for many months before it went into action, in order to have the confidence of the men. He had a tremendous influence on morale and great power in the unit. Moreover, his own training was necessary to fit him to carry out military work in action.

Dr. O. J. Ellis, in reply, said that the bringing of the motion did not represent an unwarranted grouch on the part of the medical men in his area. Newcastle had undergone tremendous industrial expansion, and the population was greatly increased. Men had been called up, and whether they had been called up with due regard to that increase in population Dr. Ellis did not know. The strain placed on the men in his area had in many cases had disastrous results. Due consideration should be given to the needs of the population as it was at present. Dr. Ellis wondered whether it might not be possible to induce the military authorities to reconsider the question whether their full wartime establishment was necessary in lines of communication areas. Cooperation between the various arms of the services could free one or two men for the various areas, and that would make the position easier.

The motion, on being put to the meeting, was lost.

The Screening of Diathermy Machines.

Dr. C. R. Sim moved the following motion, which was seconded by Dr. G. F. Elliott:

> That our association recommend that the regulations regarding the screening of diathermy machines used by qualified medical practitioners be reviewed and possible relaxation of restrictions be considered.

Dr. Sim said that the members of his association, mostly general practitioners, who owned diathermy machines, had been restricted for some years to the use of those machines in the local hospital. They hoped that a little alleviation of the strict conditions might be obtained, so that they might be allowed to use their machines in their surgeries.

Dr. R. A. Robertson said that in his area screening cost £30 to £40, and they had strict instructions that diathermy work was to be carried out only in a screened room. The main difficulty was that they could not take the diathermy machine into the operating theatre.

Dr. E. A. Tivey said that at a large hospital in his area the diathermy machine was used for surgical purposes in the operating theatre without any screening, and no question had been raised about it.

Dr. O. J. Ellis said that the same applied in Newcastle. At the same time, he thought that there would be no harm in supporting the motion, which merely said that the conditions should be reviewed.

Dr. J. G. Hunter said that the regulations governing the use of diathermy machines were introduced for security reasons, but also for a much more important reason: such machines interfered with radio transmission to aeroplanes. Moreover, such regulations would be in force after the war, in view of the great development of aeroplanes and radio location. Dr. Hunter considered that the carrying of the motion would have no particular results.

The motion, on being put to the meeting, was lost.

Medical Planning.

At this stage Dr. A. E. Panting rose to a point of order. He wondered whether, as all the rest of the items on the agenda paper dealt with group practice, they could all be combined.

Dr. J. G. Hunter discussed the whole matter of medical planning in Australia. He referred to the New South Wales Branch convention which had set the standard for the whole of Australia; the resolutions had been passed unanimously, and adopted throughout all the States of Australia, and also by the Royal Colleges of Physicians and Surgeons. So far as general principles were concerned, unanimity had been reached. No doubt there were people who had other ideas, but the general feeling of the medical profession was set out clearly and distinctly in those resolutions, which were adopted by the Federal Council in its policy. The Federal Council had recently held a very long session in Melbourne. The whole question of the profession's views on medical services was considered. It was decided to form a medical planning committee, and that medical planning committee was given certain terms of reference. The actual resolution was: "That the medical planning committee of the Federal Council be constituted. . . ." That committee was in being, had held its initial meeting, and had started to map out plans in accordance with the policy of the association. It had requested the Branches to form medical planning committees and submit their views to it at the earliest moment. So far as the question of health services was concerned, the Federal Council was of the opinion that there were some matters of major importance which the Government could well attack, such as housing conditions generally *et cetera*. The contention of the Federal Council was that the introduction of a salaried medical service would not *per se* improve the health of the community; housing, nutrition and other social problems, for example, tuberculosis, were more important considerations. But there was a feeling amongst the members of the profession that some detailed plan should be presented to the Government. Matters were

developing along the same lines in Great Britain, where there were similar problems; members of the profession there were setting down what they thought should be the general principles governing medical service. They were not going into the question of detail, but were prepared to fight the issue on general principles, to begin with, and then to implement them when an agreement on them had been reached with the Government. Medical practice had been evolving for many years, and it was impossible to say at the present time what would be the ideal form of medical practice. That could be found only by experience. But the Federal Council committee would try to find some plans that would be acceptable to the medical profession and to the Government. In one State the profession took the view that a fee-per-service system should be adopted; that system operated in New Zealand. Dr. Hunter said that such a system, if universal, would have to be controlled by the Government; he could not see how it could be worked otherwise. Dr. Hunter asked how much government control of the medical profession did its members want. The view of the Federal Council was that all medical services should develop on an evolutionary basis, and that there should be no government control if possible; if there was, it should be of minimum amount. In the policy of the Federal Council set out since the last meeting, reference was made to two important matters. The first was a system of medical service for the middle income group; this group was the most hardly hit with regard to payment for medical services. That was one of the problems which the medical planning committee proposed to consider. The New South Wales Branch Council had been giving serious consideration to the establishment of a provident medical scheme with the object of making it possible for the middle income group to meet the cost of medical care. The feeling of the Branch was that if they could get such a scheme going, that would solve the problem of medical care for the middle income group. The second important matter to which reference was made in the policy of the Federal Council was group practice, which was now being discussed by everybody. Theoretically, group practice sounded excellent, and to a large extent Dr. Hunter thought it could be introduced. In THE MEDICAL JOURNAL OF AUSTRALIA of May 15, 1943, an outline was given of group practice as it operated in America at the present time; three reports were mentioned. With regard to the meaning of the term "group practice", Dr. Hunter pointed out that it was not an easy thing to establish a group practice; it had to be done gradually. Experience in America had been much the same. Theoretically, however, group practice seemed an excellent idea, and an attempt should be made to develop it. There was a need for better facilities for consulting services; the medical planning committee of the Federal Council was at present going into that question. In order to assist that committee, the Council would ask the local associations to consider these two questions, group practice and consultant services. But the Council had in hand the question of providing medical services to the community in various ways, and it was thought that with the cooperation of the local associations and Branches in the other States, something definite might be evolved which could be put before the Government. A question might be asked as to whether, in the event of the Government's rejecting the proposed scheme, there was any other that could be put forward by the medical profession. The most important thing was for the profession to show that it was doing its best in the interests of the community, and not to budge one iota from the stand it had taken.

At this stage, after some discussion, it was decided that the order of the remaining items on the agenda paper should be altered, since one of them covered all the rest. Accordingly, Dr. C. R. Sim moved the first of a series of recommendations to the Federal Council. The motion, which was as follows, was seconded by Dr. A. E. Panting, *pro forma*:

> That this Branch strongly recommend to the Federal Council of the British Medical Association that as the doctors of Australia are in agreement concerning the necessity for improvement in the medical services to the community:
>
> (a) The Federal Council act upon this unanimity and immediately prepare one definite scheme.

Dr. C. H. Jaede said that schemes for improvement in national health services were interesting. The interesting point about the motion under discussion to him, was that the leaders of the medical profession were, by passing the preamble, admitting that their pre-war services as a whole were not the best possible methods of service—that if the medical profession was better organized somehow they could have given better service. Dr. Jaede agreed with that opinion; he thought that medical service to the community could be improved. People who had lived and practised in industrial areas realized that their service was not of the best. But they held that the greatest fault lay with the Government, because essential services to the people as a whole were lacking. Dr. Jaede instanced the difficulty of having tuberculous families treated. The greatest fault was the lack of amenities suffered by the poorer people. But the services provided by the medical profession had not been of the best; it was impossible to provide the best. Dr. Jaede went on to say that the intention was to prepare immediately one definite scheme; whatever scheme was introduced, the most important part of it was the payment to the persons giving the service. It was impossible to prepare a scheme without details of finance, and that was where the difficulty still arose. It would be possible to maintain the present system of part private practice, part friendly society lodge practice; but it had been admitted that such a scheme was not efficient. *Per capita* payment, if group practice was introduced, would be very difficult, or even impossible. With regard to a fee-per-service system, they would have to consider whether that would be possible in group practice, which was gaining prominence. Finally, there was the scheme which must not be considered, because the convention had rejected it, and because the Federal Council would not permit it, and because the New South Wales branch had rejected it—a salaried scheme. The two most important questions to be decided were, firstly, what type of payment to doctors was to be instituted, and secondly, whether group practice could be considered along with a certain definite type of payment to doctors. Questions of treatment under any particular scheme presented no great difficulty; the difficulty was to achieve unanimity on the system of payment among the members of the medical profession, combined with the worthy object of group practice. If the Federal Council could produce such a scheme, then its members were to be commended. Dr. Jaede's own local association had always stood for one thing; the question of a salaried service must be considered by the members of the medical profession in any of its discussions with the Government. Dr. Jaede considered that such a scheme should not be discarded, because under it conditions might be much better than those afforded by any other system. Dr. Jaede urged that a salaried scheme should be reconsidered, because the medical profession might "smash" unless all its members were in complete agreement.

Dr. J. G. Hunter said that he was in entire agreement with Dr. Jaede's remarks on unanimity. But he pleaded with Dr. Jaede and with others who held similar views to place themselves behind the great majority of doctors, who had said that they did not want a salaried service. The interests of the community must be put first, because the interests of the community were those of the medical profession. Dr. Hunter urged the members of the profession to think clearly on the subject of a salaried medical service. Nowhere in the world had the medical profession or the community obtained a good service from the Government. Governments would never give the medical profession what its members thought that they ought to have. Dr. Hunter was wholly opposed to any salaried service, and added that he would hate to think that the members of the profession were controlled by bureaucrats, as they would be in a salaried service. In England medical men had said that they would consider a general medical service if it was controlled by a corporate body, not by the Minister for Health. The Minister had denied that he would hand over control of the service. Dr. Hunter believed that the profession would be doing itself and the community a disservice if it ever tried to establish a salaried service. In conclusion, Dr. Hunter suggested the following alteration in the wording of the motion under discussion: "The Federal Council act upon this unanimity and immediately devise methods for the improvement of medical service."

Dr. Sim accepted the alteration.

Dr. A. E. Panting also accepted the alteration. He said that he had come 1,600 miles on behalf of his association to put forward its views. In Broken Hill the community was practical, and was open to experimentation. The medical planning committee of the Federal Council was asking for suggestions for some workable scheme. In Broken Hill they had worked out a plan for the community of 27,000 inhabitants, and it was thought that, even if the scheme had weak points, it would be a useful experiment in the development of a full scheme. The members of Dr. Panting's local association regarded the whole question of the Government's intentions of introducing a general medical service as a politcal issue, rather than as the result of a sincere

desire for the betterment of medical services to the community. The Beveridge plan and Sir William Beveridge himself had been extensively discussed. Such a plan would not be tolerated by people like Australians. Dr. Panting was pleased that certain points had come out in Dr. Hunter's remarks. The leaders of the profession would by now have realized that certain services were demanded by the people in a certain form. The form was a relatively minor matter; the service was the important thing. To be ahead of the government plans, doctors would have to give adequate service that would have to be destroyed by the Government before it could introduce any other. In Broken Hill that had been achieved by the rectification of the existing contract practice. The friendly societies, the hospitals contribution scheme and other forms of contract were involved. Friendly society contract practice constituted the bulk of the work of most of his colleagues. The cooperation of the friendly societies would be necessary; but that would not be hard to obtain, because the very existence of the friendly societies was hanging by a thread. They would be asked to open their doors wider, and to inaugurate a drive for new members. They would have to develop still further the medical benefit side of their work. The hospital contribution schemes would have to be modified in respect of their purely out-patient services. That would give contributors to such schemes the advantages of domiciliary attention and so eliminate all the congestion in the out-patient departments. Other contract services, in which there was no preliminary medical examination, could be extended. The present social services contract of the Government could be extended to embrace all whom the Government wished to add to it on the present terms. Thus every person whose fees the Government wished to pay could be put on the list. The services provided in the scheme would be along the lines of the present model common form of agreement. But an essential feature was the right of every person to choose his own doctor. In the formulation of the scheme, it had been considered that all the secretarial duties would be carried out from a district office, centrally situated and conveniently planned. The district office was an essential part of the proposal; it would help to eliminate the present enormous overhead expenses of the friendly society lodges. Collaborating schemes would still have their own executives and activities. The work of the district office would be under the direct control of the medical profession. Dr. Panting said that that scheme could be carried out in Broken Hill, and his colleagues were prepared to put it into operation. It might form the basis of a submission to the medical planning committee. With regard to specialist services and group practice, Dr. Panting said that group private practice did not fit in with their general experiences, which were of contract work. The idea of specializing within groups was good, but there were difficulties. The complete development of group practice would take time, even years; but even if its existence was only in the "blue print" stage, it would be invaluable in the present crisis. When contract practice was involved, the suggestion offered by Dr. Panting's local association was that every man engaged in that class of practice should be asked to classify himself either as purely a general practitioner or as a practitioner combining general work with an aptitude for one of the specialties. The actual grouping would then be done locally, but under the guidance of a central committee. Doctors would then be in a position to obtain any specialist training required in these special groups. Dr. Panting said that that was the plan that his colleagues intended to send to the medical planning committee of the Federal Council.

Dr. K. S. M. Brown said that the scheme was a good one, and it would be a great help to everybody if the medical practitioners of Broken Hill would develop it in their isolated area.

Dr. A. M. Davidson sounded a note of warning. He said that a great weakness in much of the discussion lay in the words "one definite scheme". Dr. Davidson did not think there could ever be one definite scheme for medical service to the people of Australia as a whole. That was because of the enormous differences of climate, industry *et cetera*. Dr. Davidson foresaw the possibility that the profession might simply waste time and put itself at loggerheads with the Government over nothing. Subsidized practices in parts of Tasmania and of New South Wales were a necessary kind of salaried service that they could not escape. That, however, did not mean that a general salaried service was for general application. They should state their "four freedoms", and refuse to work any scheme that did not provide them. They should set to work to guide their chosen scheme through the various pitfalls and avoid bureaucracy and control by government department, which would narrow and restrict all the mental outlook of the young graduates.

Dr. C. H. Jaede said that the members of his association had thought along similar lines to those of Dr. Panting's colleagues. They had wanted the Council to engage in some publicity along the lines of the next portion of the motion under discussion. Group practice meant a division of working expenses and consulting rooms. Apparently groups were to consist of general practitioners of senior and junior standing, the senior men to specialize, and some pressure would be brought to bear within the groups to determine qualifications to specialize. The great value to the patient would be that the members of groups would become more skilful, and the service would be always available. Groups might consist of five, seven, ten or twenty members, and every man in the district should eventually have the right to join a group. Each man, on his entry, would have to be classified. The advantages to members of a group would include opportunity to study and freedom from financial cares. Dr. Jaede pointed out that one of the disadvantages of group practice to the public might be that the group might be regarded as a trust or combine of doctors, and so would be unpopular. However, if it could be proved that the scheme gave good, sound, medical care, it might not be opposed. Dr. Jaede opposed the drastic, sudden introduction of the scheme, but urged the formation of experimental groups for the guidance of the rest of the men in the State. Such a procedure would give a better opportunity for the absorption of the men returning from active service.

Dr. R. A. Robertson discussed the group in Albury, of which he was a member. He said that the group consisted of four members, who were now all under one roof. The people of Albury were not like those of Broken Hill; they were highly individualistic. They liked their own doctor, and would wait for him, especially if any surgical work was to be done. Dr. Robertson said that all members of the group got on well together, and that the group owned various types of equipment, such as diathermy, X-ray and electrocardiographic apparatus. The acquisition of such things was merely a matter of gradual evolution. No consultant work within the group meant extra expense to the patient. Sometimes all four members collaborated in a serious case. The patients felt that they were receiving a service that they would not receive apart from group practice. From the point of view of the comfort of the members of the group, one of them was on duty from midday on Saturday until 9 a.m. on Monday, and the rest, in ordinary circumstances, could do as they liked. There was very little work during the week-end, because the public was becoming educated. The group was also evolving a scheme by which each member in turn would do the night work. That was to the advantage of the other medical practitioners in the town; if the members of the group could make such an arrangement, then they could do the same. The scheme could and did work, provided there was a certain amount of "give and take" among the members of the group. Group practice was thus for the benefit of the individual doctor and gave a much better service to the public.

Dr. R. D. Mulvey said that he had been interested in Dr. Robertson's remarks. In his own area, the distances covered were so vast that the establishment of group practice would be very difficult. Dr. Mulvey said that his colleagues had come to the conclusion that it would be impossible to have general practitioner specialists in the towns in his area. However, in one of the towns a group practice had been in operation since 1920. Dr. Mulvey described the scheme and said that it was satisfactory to all concerned; it gave a good service to the community.

Dr. C. H. Jaede rose to a point of order. He said that the discussion had turned on the advantages of group practice, and he asked that they deal with the business of the meeting.

Dr. R. J. Jackson said that he had ascertained the opinions on group practice of representative members of the medical profession in the various towns in his area. In several of the larger towns it was thought that group practice could be started. The men in the smaller towns considered such a step inadvisable. Those men worked in collaboration with each other in present circumstances. Dr. Jackson's own feeling was that group practice was a splendid ideal, but he doubted whether it could be achieved completely in his own town. The country men whom he represented were more interested in the Council's scheme to extend consultant services.

Dr. C. H. Jaede said that group practice had advantages and disadvantages. Its advantages were the possibility of

having holidays and week-ends free and nights off duty, and also the ability to consult with other members of the group in difficult cases. The disadvantages were chiefly due to the differences that normally existed between men; sometimes it was impossible to judge at first sight from a man's characteristics what type of person he was, and, moreover, people changed over the years. In a group it was difficult to discipline an offending member.

The first part of Dr. Sim's motion now read as follows:

> That this Branch strongly recommend to the Federal Council of the British Medical Association that as the doctors of Australia are in agreement concerning the necessity for improvement to the medical services to the community:
>
> (*a*) The Federal Council act upon this unanimity and immediately devise methods for the improvement of medical services.

The motion, on being put to the meeting, was carried.

Dr. C. R. Sim then moved the second part of the same motion, which was seconded by Dr. R. D. Mulvey:

> (*b*) That this scheme be presented to the Federal Council as being the only one acceptable to the profession and this presentation be combined with simultaneous publicity through the Press and radio by the Federal Council.

Dr. Sim said that some of the members of his association held that some suggestions along these lines had already been put forward by medical men in Australia to the Federal Council, especially with regard to the treatment of tuberculous patients, ambulance services and hospitals, and apparently those points and others had been published in the newspapers as suggestions from the Federal Government, which had taken the credit for the suggestions. That was the genesis of the second part of his motion. Dr. W. F. Simmons said that, while he agreed with the resolution, he wished to point out that such activities involved a question of organization. He pointed out that if the motion was carried, it would also be necessary to carry a motion on organization, which would cost money.

Dr. Sim said that he was of the opinion that the members of the medical profession of Australia did not put their hands in their pockets deeply enough.

Following further discussion, the mover and seconder agreed to the motion being amended as follows:

> That the Federal Council be requested to present these methods to the Federal Government as being those acceptable to the profession and that this presentation be combined with simultaneous publicity through the Press and radio by the Federal Council.

The motion as amended was put to the meeting and carried.

Dr. C. R. Sim then moved the third part of his motion, which was seconded by Dr. R. A. Robertson:

> (*c*) That the questions of group practice and specialist services be incorporated in the scheme.

Dr. R. J. Jackson said that he was sure that, on account of the population and the distances to be traversed, no good specialist would waste his time visiting the area of his local association. The people preferred to go to Newcastle or Sydney. There were rumours that the Government intended to create more base hospitals, and if that was so, many more specialists would be available. Dr. R. A. Robertson said that not more than 10% of patients in his area required specialist treatment. They were near to Melbourne if necessary, and specialists were not required. Dr. Sim referred to the state of affairs at Wagga. He was convinced that in base hospital towns it was more important to have pathologists than any other kind of specialists. Dr. G. L. Howe endorsed Dr. Sim's remarks about pathologists. But he pointed out that it was difficult for a pathologist to collect fees, because the patient seldom saw him. Referring to the Federal Council's scheme for providing consultant services, Dr. Howe said that he did not see how it was to be implemented while its financial aspect was unknown. That apparently depended entirely on what the Federal Government intended to do. Dr. A. E. Panting said that a differentation had to be made between real, full-time specialists and specialists in a group practice. He thought that not every patient who required special service required the services of a specialist. In Broken Hill they encouraged one man to do one type of work in addition to his general work, and to become proficient in it. Dr. Panting thought that that type of specialization should be encouraged; it was quite adequate for 90% of patients requiring special attention. Dr. R. D. Mulvey said that Dr. Panting's comments applied also to his district. Provision should be made for the town with one or two practitioners, and also for the smaller towns. The mover and seconder agreed to the motion being amended to read as follows:

> That the methods providing for group practice and specialist services be incorporated.

The motion as amended was put to the meeting and carried.

Dr. Sim then moved the fourth part of his motion, which was seconded by Dr. N. E. McLaren.

> (*d*) That the medical profession be not concerned with any mechanism for pension payments during unemployment or disablement of patients.

Dr. Sim said that the members of his association thought that it would be most unwise for any scheme for health services to include any mechanism for pension payments.

Dr. J. G. Hunter said that that had always been maintained by the Branch. Claims for sickness benefits and pensions should be completely divorced from medical care.

The mover and seconder then agreed to the motion being amended as follows:

> That schemes for the provision of sickness benefits and pensions be divorced from schemes for the provision of medical care.

Dr. Sim then moved the final part of his motion, which was seconded by Dr. R. A. Robertson:

> (*e*) That these methods definitely adhere to this previously agreed on principle of retention of private practice.

The motion was carried.

It was resolved on the motion of Dr. J. P. Hardie, seconded by Dr. R. A. Robertson:

> That the Council of the British Medical Association, New South Wales Branch, be requested to arrange for the establishment of experimental group practice under its guidance.

Organization.

Dr. J. G. Hunter referred to the question of the organization of the profession, and to the Federal Council's proposals for a full-time secretariat. Dr. Hunter urged those present to organize their members in their own areas. As far as the Federal Council was concerned, it intended to do its best to achieve this unanimous point of view right throughout Australia, and was going into the whole question.

Medical Societies.

MEDICAL SCIENCES CLUB OF SOUTH AUSTRALIA.

A MEETING of the Medical Sciences Club of South Australia was held on July 2, 1943, at the Institute of Medical and Veterinary Science, Adelaide.

Symposium on Vision.

DR. T. L. MCLARTY read a paper on the evolution and physiology of vision. In outlining the evolution of the visual apparatus, he traced the advance from the negative or positive response of the unicellular organisms, the next step being the differentiation of visual cells, which later became arranged in what could be recognized as an "eye"; from these simple cup or vesicular eyes was eventually formed the human visual apparatus, and Dr. McLarty drew attention to the probability that the requiring of such an efficient visual apparatus had played an important part in establishing the dominance of man.

Dr. McLarty, in referring to the physiology of vision, spoke of the early teachings of the Greek and Arabian scholars, and explained that it was left to Kepler to lay a true foundation for physiological optics. He discussed the photochemical and electrical changes occurring in the visual apparatus on exposure to light, dealing with the pigmentary changes, the histological changes in the retina, the bleaching and possible distribution of visual purple, the "current of

rest" and the action currents of the optic nerve. He pointed out the probability that there were two visual mechanisms (the duplicity theory), one mediated by the rods and taking charge when the eye was dark-adapted (scotopic vision), the other mediated by the cones and coming into play in the light-adapted eye (photopic vision); in support of this theory, Dr. McLarty cited the evidence afforded by the two different types of luminosity curve, the chemical and electrical responses of the retina and the whole phenomenon of adaptation.

In conclusion, Dr. McLarty pointed out how the sensation arising from the physical stimulus had to be sublimated into a perception of consciousness, and how this percept was moulded and influenced by past experience and inherited dispositions.

Recent Work on the Central Connexions of the Optic Nerve.

Professor F. Goldby read a short *résumé* of the connexions of the optic nerve to the lateral geniculate body and tertum, and reference was made to the possibility of hypothalamic connexions by way of the "accessory optic tracts". The general features of the functions of these regions in relation to vision were discussed, with especial emphasis on the appreciation of spatial relationships. It was noted that this function of appreciating spatial relationships was reflected in the structural organization of this visual pathway, where precise localization of function was more obvious than in any other part of the central nervous system. Localization within the central optic pathways was illustrated by an account of the evolution of hemidecussation at the optic chiasma in relation to the development of binocular vision.

Professor Goldby then discussed the possibility of hypothalamic optic connexions in reference to recent work on the ferret. In this animal it had been shown that the onset of œstrus could be hastened or retarded by increasing or decreasing the amount of illumination to which the animal was exposed. It was shown that while the physiological effects of light on œstrus were undoubted, and though they were abolished by cutting the optic nerves, the actual connexions in the brain through which these effects were caused had not yet been demonstrated.

Dr. O. E. Nichterlein demonstrated some sections prepared in researches on degeneration of the optic tract and the lateral geniculate body following section of the optic nerve in sheep. Examination of Marchi sections through the chiasma revealed the incomplete decussation of the optic nerve. Uncrossed optic fibres were believed to be concerned with binocular vision. If this was so, half the fibres from the binocular field should cross in the chiasma and half remain uncrossed. In the sheep, in which the possible binocular field was approximately one-fifth of the field of each eye, uncrossed fibres actually were of the order of one-tenth of the optic nerve fibres. There was need for more accurate quantitative studies in a series of animals with a range of possible binocular fields. The examination of sections of the lateral geniculate body showed this to be a trilaminar structure in the sheep. The cutting of one optic nerve led to transneuronal degeneration in both lateral and geniculate bodies, and showed that the crossed fibres of each eye were connected with the inner and outer laminæ, while the uncrossed fibres were connected with the middle lamina. In other words, each lateral geniculate body received visual stimuli from both eyes. These, however, were segregated in different laminæ and were apparently not yet coordinated. In a specimen from which part of the occipital cortex had been removed, retrograde degeneration in part of the lateral geniculate body was seen. This did not affect laminæ selectively, but caused degeneration of part of all three laminæ; thus stimuli from the two eyes were not segregated in the cortex. This illustrated the grounds for the accepted belief that binocular coordination of visual images was a geniculo-cortical mechanism. In further Marchi sections an aberrant bundle of fibres was seen; it left the optic nerve before the chiasma was reached, crossed in the roof of the supraoptic recess and rejoined the optic tract. In the roof of the supraoptic recess this bundle was associated with a small group of nerve cells. Dr. Nichterlein finally referred to recent work indicating that in some animals there might be direct hypothalamic optic connexions having a bearing on sexual function, and to the possible significance of these fibres. He also showed further sections illustrating what appeared to be other direct hypothalamic connexions of the optic tract, and pointed out that in the ferret similar fibre bundles rejoined the optic tract, and did not terminate in the hypothalamus.

Special Correspondence.

LONDON LETTER.

From Our Special Correspondent.

If the communications of medical correspondents could reach their overseas destinations with the celerity and uncensored certainty of those of governments and their officials—which, alas, is impossible—the job would be better worth while doing and might even reach those for whom they are intended in time to be of some little service to them. The "White Paper" is a case in point.

What is the "White Paper" and of what possible interest can it be to the medical men of the far-away Commonwealth of Australia?

The "White Paper", to be published very shortly as a government document, will announce the British Cabinet's decisions on the future conduct of medical practice in accordance with Assumption B of the Beveridge Report. Its importance to every member of the medical profession both at home and overseas cannot therefore be over-estimated and no doctor can afford to ignore it. The "White Paper" may revolutionize medical practice and profoundly alter existing relations between doctor and patient. On the other hand, it may not, for the fact of the matter is that, at the time of writing, no one outside the British Cabinet knows its contents or what exactly it may portend. Until publication the "White Paper" is a profound secret.

The British Medical Association is thus placed in a difficulty and at a disadvantage, but even so its Central Executive Council has not been forgetful of its responsibilities, not only to its own members but to the profession as a whole. The crisis has, indeed, long been foreseen, so it may be well to remind readers of the successive steps which the Association has long since taken to provide that national medical service which the Beveridge Report now apparently recognizes as essential and which the strength of public support given to that report has now forced upon the Government.

Long before the outbreak of war and prior even to the recently acquired fame of Sir William Beveridge the medical profession had formulated its own plans for an improved medical service for the nation, and the pages of the *British Medical Journal* bear ample testimony to the fact. Subsequent to the outbreak of war, but again before the appearance of the Beveridge Report, the Association had set up its medical planning commission, with the idea of still further improving its previous proposals for a medical service for everybody. In accordance with the democratic principles which govern the Association's proceedings, the proposals of the Medical Planning Commission were submitted to a specially summoned representative meeting in London in September, 1942. The several conclusions reached at that meeting have long since been published in the *British Medical Journal* and should thus be known to every member of the Association. It may, however, be just as well to reiterate the almost unheard-of unanimity with which the profession, through its specially elected representatives, rejected all idea of a salaried medical service.

Armed with the now known wishes of the profession, the Council next approached the Minister of Health, with whom several meetings, mostly confidential, were held. One thing, however, emerged and was made public. The Minister's proposals were so little to the liking of the profession that, in his own words, he threw his ideas "into the discard". His new ones are a State secret, but the "White Paper" will enlighten us.

The Association and its Council are thus confronted with the unprecedented position of having to meet proposals of whose nature they are in total ignorance and with which they may find themselves in complete disagreement. In any case the Council must consult its constituents. To do so after the publication of the "White Paper" may be too late for effective action, of either approval or disapproval, to be taken. To do so in advance is no less difficult, for, as stated, no one knows what proposals the Cabinet intends to make. The Council buys a "pig in a poke".

To this delicate position the Council has given long and anxious consideration. It has now enumerated certain guiding principles for the establishment of a national, but not salaried, medical service, and these are based on those formulæ already accepted by the profession. They will be submitted to another representative meeting to be called

before this letter can possibly appear. It is thus hoped that the Council, armed with the voice of a united profession, may cooperate with the Government in the formulation of plans acceptable alike to Government, profession and public. So far the last have had no say in the matter.

Coincident with this crisis in the affairs of the medical profession, the Chairman of Council, Mr. H. S. Souttar, has for unavoidable reasons been compelled to relinquish the chairmanship, and by the time these lines are in print his successor will have been elected, but there is no doubt in making its selection the Council will choose the one best able to guide it and the Association through the difficult days ahead.

Notwithstanding that much of all this may be well known to our colleagues in Australia, it has seemed desirable to emphasize the possible revolution with which medical practice may be confronted in the not very distant future.

Correspondence.

THE PARLIAMENTARY JOINT COMMITTEE'S REPORT.

Sir: While agreeing with all that Dr. A. M. Davidson had to say in his letters criticizing the above report, I would like to point out that Dr. Davidson was wide of the mark when he stated that there were at least 1,000 general practitioners practising in Australia at the present time. According to the report of the subcommittee of which Dr. A. E. Brown was a member there were 6,464 practitioners in Australia. Records in the office of the New South Wales Branch of the British Medical Association show that there were 2,589 practitioners on the New South Wales Register in April, 1941. That means that 40% of the medical population of Australia were registered in New South Wales. This figure has been accepted for some years. At the time of the investigation by the subcommittee of which Dr. Brown was a member there were 854 general practitioners in actual practice in New South Wales (432 in the country and 422 in the metropolitan area). Taking these 854 practitioners as representing 40% of the general practitioners in Australia available for interview, it means that there were in all 2,135 general practitioners in Australia, of whom 105 were actually seen. Considering that slightly less than 5% of the general practitioners available were interviewed, little value can be placed on any deductions made from such interviews.

Yours, etc.,

W. F. Simmons.

Bexley,
New South Wales,
October 23, 1943.

THE MEETING OF THE FEDERAL COUNCIL.

Sir: Professor R. Douglas Wright, in his brief survey of the meeting of the Federal Council published in the issue of The Medical Journal of Australia of October 23, 1943, refers to the importance of adequate statistics and factual data in determining matters of policy. With this statement no member of the Federal Council will disagree, though there may be difference of opinion as to the relative importance to be attached to statistics and factual data.

Had Professor Wright himself paid attention to facts, he would not have come to erroneous conclusions. The proceedings of the meeting of the Federal Council are not reported in full in The Medical Journal of Australia, as will be obvious when it is stated that the meeting lasted three whole days. Consequently Professor Wright has no knowledge of what factual and statistical information the Council had before it. In effect, he failed to acquaint himself of all the facts, and so is guilty of the very fault of which he accuses the Council.

So far as the cost of a full-time secretariat was concerned, the first fact before the Council was that the duties of the present secretariat had been increasing and would increase still further in the future.

The second and foremost fact was that concurrent with these duties and with the increasd responsibilities of the Federal Council, its expenses had been increasing and would still further do so irrespective of whether a full-time secretariat was appointed or not.

The third and very definite fact was that it was difficult to foretell with absolute accuracy the part that the Federal Council would be called upon to play in the future. In order to have a better understanding of its future obligations the Federal Council decided at its meeting in March, 1943, to appoint a committee to report on the expenditure involved in a full-time secretariat. This report was before the meeting in August.

There were, however, many facts concerned with the appointment of a full-time secretariat which do not appear in the discussion as reported, but which were known to members of the Federal Council. There were certain difficulties in connexion with the appointment, and it was these difficulties rather than the question of the necessity for the appointment which provoked the discussion. A lack of appreciation of these difficulties has led Professor Wright to form a wrong impression of the matter—and impressions are not established facts.

So far as the matter of rehabilitation is concerned, Professor Wright has no knowledge whatever of the information that was before the Council. The report on this matter was submitted to the Federal Council by the New South Wales Branch of the Association. The Council of that Branch, seized with the importance of the question of rehabilitation, appointed a special committee, which included three orthopædic surgeons, to draw up a report for submission to the Federal Council. The committee's report was based on accurate factual and statistical information. It did not reflect on the efficacy of the present methods of treatment—another erroneous impression held by Professor Wright—but aimed at the establishment of a service in which the general physical condition of the patient and his mental outlook would be treated in addition to his injured and diseased part. That such a service would be beneficial to the community is evident from the factual and statistical information available.

In regard to the selection of students for medical courses, Professor Wright says: " . . . but we are still left with the statement . . ." The statement was a statement of a member of the Council but not of the Council itself, and it did not form a basis of any subsequent resolution of the Federal Council.

Finally Professor Wright may rest assured that the Council is doing its best to get accurate factual and statistical data. But policy cannot be based on such data alone. Indeed policy may be influenced by impressions, while scientific reasoning and sound observation cannot be neglected.

Yours, etc.,

J. G. Hunter,
General Secretary, Federal Council of the British Medical Association in Australia.

135, Macquarie Street,
Sydney,
October 25, 1943.

Sir: The Federal Council, by resolution of August 23, 1943, has declared for preference to Australians as against aliens in Australian universities, and it would be well for every member of the British Medical Association to do a little autopsychoanalysis and introspection in order to see how far he has departed from the precepts of our moral and medical teachers.

In the argument supporting the resolution, statements are made only to be disproved by a subcommittee, though the refutation of them did not make any difference to the resolution. Such statements as, that foreign languages, in which they were expert, give aliens more marks at the examinations, were made, but refuted at once. It appears that physics, chemistry, mathematics and biology are important for matriculation, but not languages, dead or alive.

It appeared to me that the same old inaccurate stories were told to a sympathetic gathering: "Soon there will be a majority of aliens over our Australians in the profession." "My clinic contains 50% of German and unpronounceable names." The charge made by the politicians that the university was the refuge of the rich during the war, though denied strenuously by the profession, was taken up by the Federal Council and ascribed to the aliens.

I leave the ethical and moral teaching of the attitude we should adopt to "the stranger within our gates" to those who teach it and those who should learn it, to ask the question: "What is an alien?"

In the United States, a person who naturalizes and thus becomes an American citizen ceases to be an alien. The

Federal Council cannot adopt any other standard, but if it did, it could not call alien the sons and daughters born here of parents who are naturalized. Judged by such a standard their remarks lack point.

I have secured a list of students from the hospital at which one of the honoraries who discussed the matter attends. Out of 95 students only three are not Australian born, and of these two were brought here as infants. Their fathers are naturalized. Five names are difficult to pronounce. One is French, one Greek, one Yugoslav or Czech and two Polish—all of them allies. The French name presented difficulty to the late Sir George Syme when lecturer in surgery about 35 years ago. That student was subsequently knighted by the King. If aliens are to be judged by names, what of Roosevelt, Eisenhower or Monash?

A resolution similar to that of the Federal Council was before the university students and led to General MacArthur writing to their journal pointing out that he would come under the ban.

It would appear that the fact that American soldiers may want to matriculate here after the war has escaped the notice of the Federal Council. They are aliens under the definition of the resolution.

There are several wider aspects of this resolution. Are we to make the new Australians, as they should be called, just hewers of wood and drawers of water, or are we to give all who come here the rights of honourable citizenship? Shall we be confident that the Australian brains of our children will beat them in the matriculation examination, or shall we rely on some subterfuge to give our children preference in the intellectual professions? "Ah", but it is said, "Yes—so long as they are British." Yet those British immigrants who came here received such a hot reception in the past that they left our inhospitable shores. They felt they were treated as aliens. Perhaps there are those who say: "It doesn't matter." "It can't happen here." "Things will be different after the war." Rarely does war ennoble a nation.

The Federal Council had its opportunity to rise above the herd during this war, but it retrogressed. It develops hatred. It forgot that a mental state that incubates racial or national difference may well ruin a nation. Thus France in 1900—so Germany now. Rauschning writes that Hitler declared that when he desires propaganda on any point he refers always to the aliens. "It is a trump card", he says; "it always works—it never fails."

We must be careful how we react to provocative sentiments and resolutions lest we become fascist-minded. We may lose all our free democratic institutions, including our medical organizations, dragging ourselves down with those whom we injure.

Yours, etc.,

D. Rosbby.

339, Church Street,
Richmond,
Victoria,
October 14, 1943.

Nominations and Elections.

The undermentioned have applied for election as members of the New South Wales Branch of the British Medical Association:

Barrett, Cedric George, M.B., B.S., 1942 (Univ. Sydney), 77, Main Road, Speers Point, New South Wales.

Clements, Alan Twyman, M.B., B.S., 1941 (Univ. Sydney), Captain A. T. Clements, R.H.Q., 2/1 Australian A/A Regiment Composite, A.I.F., Australia.

The undermentioned have been elected as members of the South Australian Branch of the British Medical Association:

Short, David Weddell, M.B., B.S., 1940 (Univ. Adelaide), 2, Maroong Avenue, Broadway, Glenelg.

Carter, John Joseph, L.R.C.S.I., L.R.C.P.I., L.M. (R.C.P.S.I.), L.R.C.O.G., L.M. Roth. Dub., 1937, No. 2 Explosives Factory, Box 142417, G.P.O., Adelaide.

Books Received.

"Rehabilitation of the War Injured: A Symposium", edited by William Brown Doherty, M.D., and Dagobert D. Runes, Ph.D.; 1943. New York: Philosophical Library. 9¼" × 6¼", pp. 584, with many illustrations. Price: 10s.

"Symptoms and Signs in Clinical Medicine: An Introduction to Medical Diagnosis", by E. Noble Chamberlain, M.D., M.Sc., F.R.C.P.; Third Edition; 1943. Bristol: John Wright and Sons, Limited; London: Simpkin Marshall (1941), Limited. 9" × 5½", pp. 464. Price: 30s. net.

"Diseases of the Nervous System Described for Practitioners and Students", by F. M. R. Walshe, O.B.E., M.D., D.Sc., F.R.C.P. (Lond.), Hon.D.Sc.; Third Edition; 1943. Edinburgh: E. and S. Livingstone. 8¾" × 5½", pp. 366, with 46 illustrations. Price: 15s. net, postage 7d.

Diary for the Month.

Nov. 2.—New South Wales Branch, B.M.A.: Organization and Science Committee.
Nov. 3.—Victorian Branch, B.M.A.: Branch.
Nov. 3.—Western Australian Branch, B.M.A.: Council.
Nov. 4.—South Australian Branch, B.M.A.: Council.
Nov. 5.—Queensland Branch, B.M.A.: Branch.
Nov. 9.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
Nov. 9.—Tasmanian Branch, B.M.A.: Branch.
Nov. 12.—Queensland Branch, B.M.A.: Council.
Nov. 16.—New South Wales Branch, B.M.A.: Ethics Committee.
Nov. 17.—Western Australian Branch, B.M.A.: Branch.
Nov. 18.—New South Wales Branch, B.M.A.: Clinical Meeting.
Nov. 23.—New South Wales Branch, B.M.A.: Medical Politics Committee.
Nov. 24.—Victorian Branch, B.M.A.: Council.
Nov. 25.—New South Wales Branch, B.M.A.: Branch.
Nov. 26.—Queensland Branch, B.M.A.: Council.

Medical Appointments: Important Notice.

Medical practitioners are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

New South Wales Branch (Honorary Secretary, 135, Macquarie Street, Sydney): Australian Natives' Association; Ashfield and District United Friendly Societies' Dispensary; Balmain United Friendly Societies' Dispensary; Leichhardt and Petersham United Friendly Societies' Dispensary; Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney; North Sydney Friendly Societies' Dispensary Limited; People's Prudential Assurance Company Limited; Phœnix Mutual Provident Society.

Victorian Branch (Honorary Secretary, Medical Society Hall, East Melbourne): Associated Medical Services Limited; all Institutes or Medical Dispensaries; Australian Prudential Association, Proprietary, Limited; Federated Mutual Medical Benefit Society; Mutual National Provident Club; National Provident Association; Hospital or other appointments outside Victoria.

Queensland Branch (Honorary Secretary, B.M.A. House, 225, Wickham Terrace, Brisbane, B.17): Brisbane Associated Friendly Societies' Medical Institute; Bundaberg Medical Institute. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL or position outside Australia are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.

South Australian Branch (Honorary Secretary, 178, North Terrace, Adelaide): All Lodge appointments in South Australia; all Contract Practice appointments in South Australia.

Western Australian Branch (Honorary Secretary, 205, Saint George's Terrace, Perth): Wiluna Hospital; all Contract Practice appointments in Western Australia.

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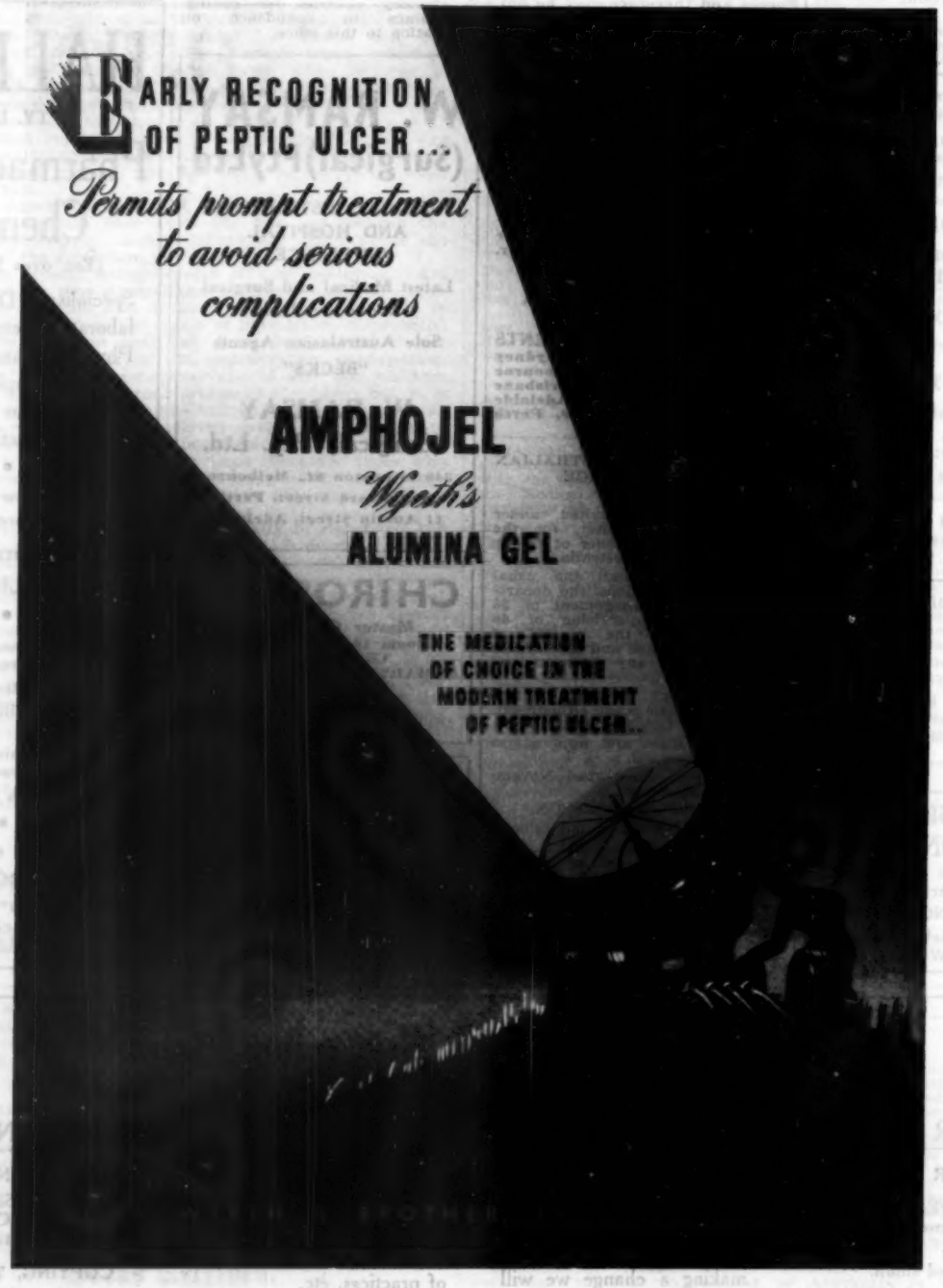

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